ENGINEERING NEWS-RECORD

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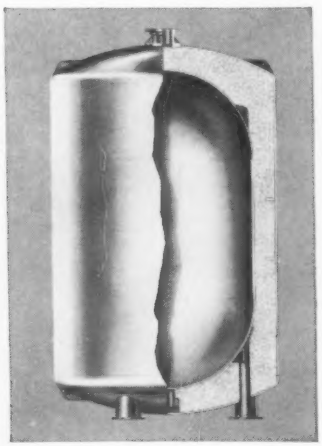
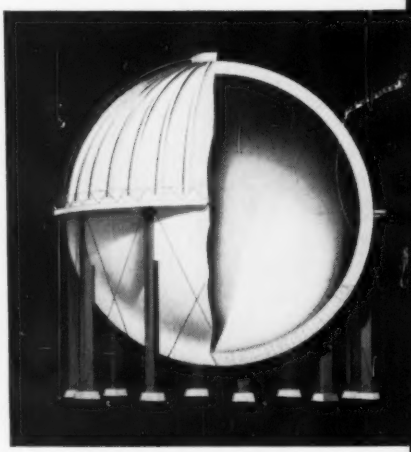
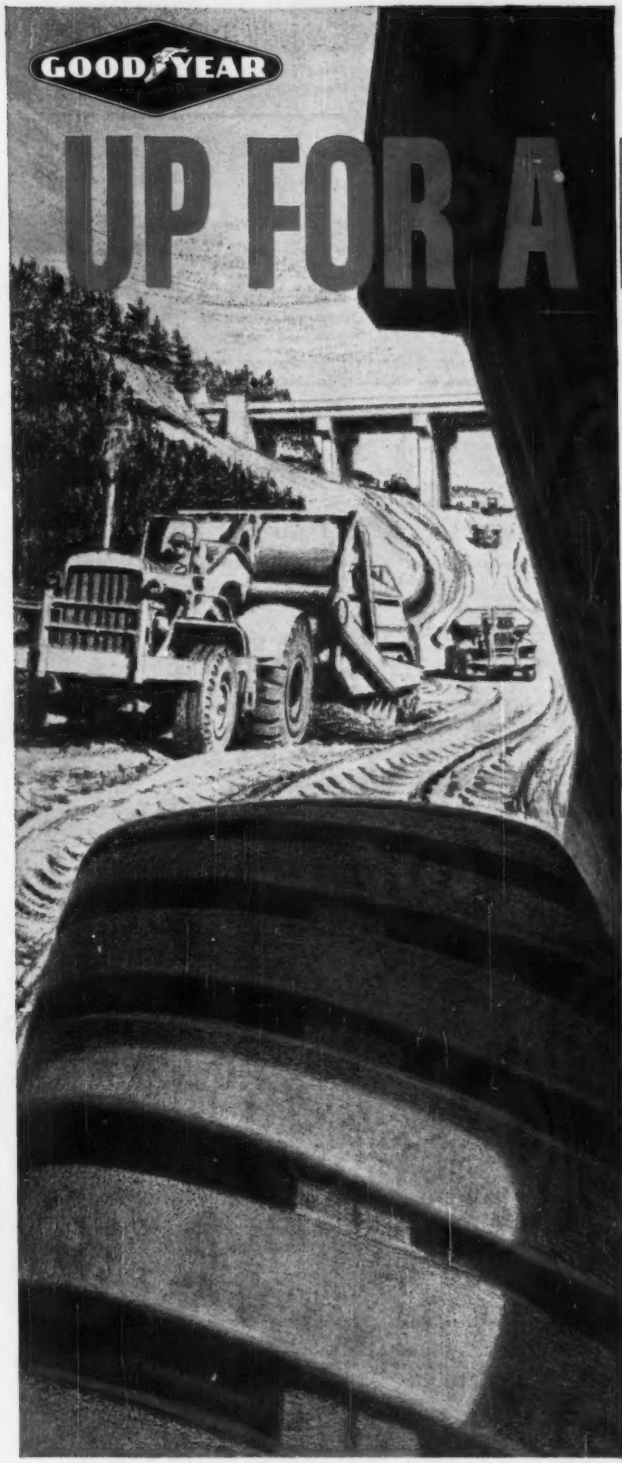


One of 25 LOX Storage Tanks—
9% Nickel Inner Shell



Cutaway of 45 ft 10 in. PDM
Insulated Double-Shell Sphere



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9 Twin Bridges

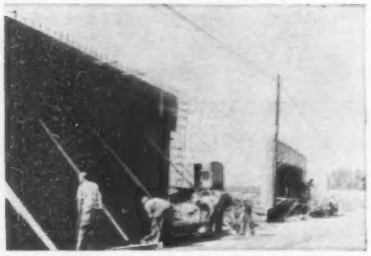
Symons Steel-Ply Forms Lick Tight Schedule

. . . Forms Set Horizontally and Stripped in Sections

Eight months to build the piers and substructure for nine twin highway bridges. Moore Brothers Construction Co., Verona, Virginia had this tight schedule to meet . . . and made it. Figuring concrete formwork correctly was an important factor in meeting the schedule.

The bridges are part of the 28-mile superhighway that connects the new Dulles International Airport at Chantilly, Va., with Washington, D.C.

On this project, the forms were assembled, stripped and moved easily by



Symons Forms are easily moved from completed pier (right) to new pier at left. Symons scaffold brackets aided materially in setting up forms.

manpower so that the forms could be reassembled on a second pier while the first was being stripped. Concrete was poured at the rate of about 3 feet an hour with each pier poured in a continuous operation.

The complete *Chantilly story* sent *free* on request. Symons Steel-Ply Forms are rented with purchase option.

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for SLATTERY CONSTRUCTION COMPANY MASPETH, L. I., NEW YORK

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Your Northwest is a real Rock Shovel. Northwests load fast and easily. Ample power combines with the Northwest Dual Independent Crowd to utilize force, that most other Independent Crowds waste, giving you full dippers without dipper jockeying. Uniform Pressure Swing Clutches, the Feather-Touch Clutch Control and other Northwest advantages combine to get the job done. Add to these, the immeasurable value of Northwest dependability—the fact that your Northwest is always ready to go—and you have a small part of the reason why there is no finer 2½ yd. Shovel than the Northwest 80-D.

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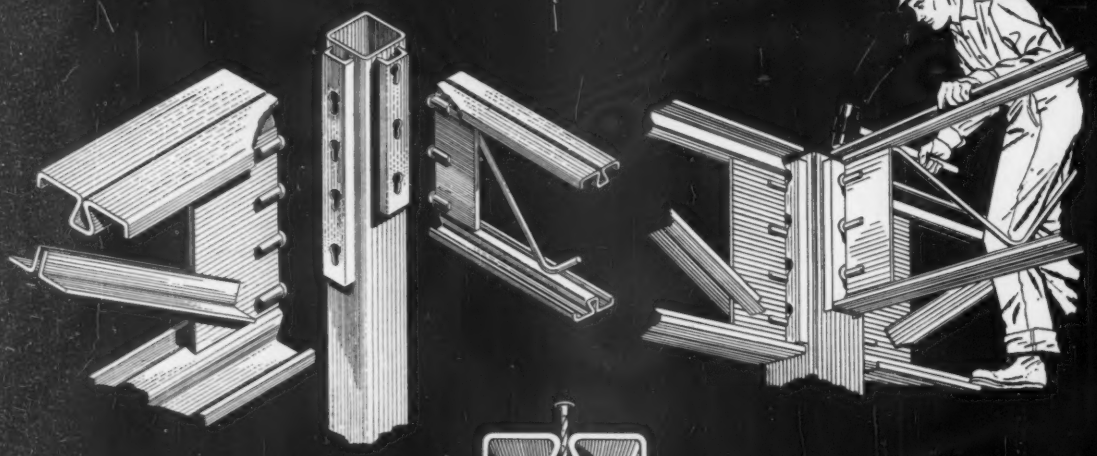

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It is poor economy to save a few dollars by buying inferior sewer pipe. The cost of the pipe itself is perhaps one-sixth of the complete sewer installation cost. If for any reason the pipe must be repaired or replaced, costs skyrocket. You have the enormous expense of tearing up the pavement, maintaining sewage flow during reconstruction and replacing the pavement. And, you must buy new pipe. You can avoid trouble by choosing the right pipe in the first place. Why accept the risk of a substitute, when you can have the real thing? There is only one pipe you know will endure: vitrified clay pipe. Amvit Jointed Clay Pipe is strong and rigid, can't sag or bend. The plastic joint, like the pipe, is acid resistant. And, roots cannot enter this tight compression joint. Acid-laden, high temperature sewage, discharged from washing machines and garbage disposal units will not bother Amvit Jointed Clay Pipe in any way. Neither will the abrasive action of sand or gravel. For more information on how Amvit can help cut sewer project costs, write or call American Vitrified Products Company, National City Bank Building, Cleveland, Ohio, or our office nearest you.

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The safe and easy OTC way to remove and install track rollers on HD-21 track roller assemblies. Use only two special tools—an OTC puller yoke and step plate adapter—with standard 50-ton Power-Twin hydraulic push-puller assembly.

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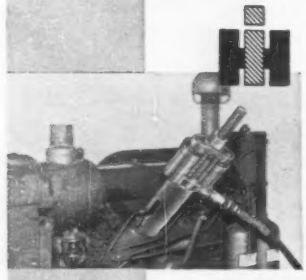
Four OTC tools combine to hydraulically handle this otherwise difficult, time-consuming job: (A) push-puller, (B) push-puller legs, (C) male-female adapters, (D) 17½-ton ram and hydraulic pump assembly. One of many Caterpillar pulling jobs handled safely and easily with special OTC tools.



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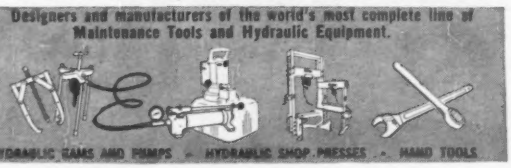

PULLERS AND PULLER SETS - HYDRAULIC RAMS AND PUMPS - HYDRAULIC SHOP PRESSES - HAND TOOLS

Reader Comment

A Matter of Ethics?

SIR—The article Plant Builders Shop for Ideas (ENR Dec. 22, 1959, p. 37) was a report on the 1960 Industrial Building Exposition and Congress, at which many firms had booths for the purpose of soliciting business. The thing which troubles and puzzles me is how it is possible for architects, engineers, and architect-engineer firms to compete with package builders who solicit business, advertise, set up booths, have public relations arrangements, and so forth, for the purpose of getting new industrial building accounts.

As a matter of fact, it also seemed rather strange to me that engineering companies or companies that call themselves engineers (and not builders) can come to these conferences for the purpose of soliciting business. Is this not contrary to the canons of ethics of the professions involved?

It seems to me that engineers, architects and engineers-architects should take a strong stand against the continuance of conferences and congresses of this type which are for the purpose of getting business, business that we are unable to solicit.

ROBERT E. LEVIEN
Long Island City, N. Y.

Not So 'Novel'

SIR—We note with interest your description of the "Novel Idea" of using dual-drum pavers instead of conventional tilting in a central mix plant on a paving job near Cincinnati (ENR Dec. 22, 1960, p. 113). This is a rather common practice in the lower Mississippi Valley.

Our company started using dual-drum pavers with central mix plants in 1952, but the idea was not original with us. I remember seeing it done on a job in 1946 and have seen it done a number of times since.

Although it has some other advantages, the principal reason for this practice is that the output of larger mixers is reduced to such an extent by the longer mixing time required by some specifications.

DANIEL K. FORDICE
Fordice Construction Co.
Memphis, Tenn.

(Reader Comment continues p. 10)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

University surveys indicate:

STARTING SALARIES OF ENGINEERS ARE DECEPTIVELY HIGH

By James M. Jenks

TWO SEPARATE STUDIES of the salaries made by college graduates appear to contradict the commonly held belief that engineers today make out better financially than their classmates who major in non-technical subjects.

Both surveys were conducted by large universities. The first polled graduate engineers; the second, company executives. And both resulted in identical findings! That is, the average engineer today – despite a deceptively high starting salary–climbs fast but not far.

The need for technically trained men in recent years has exceeded the supply to such an extent that companies have been forced to bid for their services–to actually set-up "recruiting" offices on college campuses all over the country. Thus, starting salaries have gone up and up. But the income ceiling for these technically-trained men is lower than that for managerial personnel.

Despite the substantial head start engineers have, the differential in money earned over a ten-year period averages out at $7,000 more for the management man.

And from the tenth year on, the administrator's salary obviously outstrips that of the engineer by a wider and wider margin.

This, of course, is not to say that engineering students would be wise to shift to the study of business administration–or that working engineers face a bleak future. Quite to the contrary, the continuing growth of technology means that men with technical backgrounds are as ideally qualified for the highest rewards industry has to offer–*if they also have a knowledge of the underlying principles of business.*

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If you want to avoid the thorny barriers to success–if you're ambitious, determined to move up fast–send today for the Institute's 48-page descriptive booklet, "Forging Ahead in Business".

It explains what a man must know today to make $15,000 or more a year . . . what he must do to accumulate this knowledge. It tells why men of equal ability fare so differently in the race for better jobs and bigger salaries. It analyzes the causes of failure . . . the reasons for success. And it outlines an executive-training program which is so complete and so scientific that each day subscribers are brought a little closer to a mastery of business procedures.

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CHEVROLET IFS "WALKS" WHEELS OVER TRUCK-BUSTING BUMPS!

IFS = FRONT INDEPENDENT SUSPENSION

Chevrolet truck wheel action on rough road surface, as depicted by 4-stage stop-action photography.

CHEVROLET I F S PROTECTS YOUR PROFITS THESE THREE WAYS:

I F S = FRONT INDEPENDENT SUSPENSION

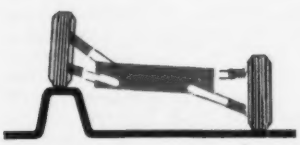
1 *Rides down high maintenance costs.* When a bump looms up, Chevy's independently suspended front wheels "walk" right over it. Most road shocks and jolts never reach the chassis, cab or body. The truck rides *smoothly*, takes less of a beating, stays in cost-saving shape longer. Your income doesn't dribble away in big repair bills. And you don't lose money through excessive downtime, either.

2 *Rides cargoes over rough spots with less damage . . . minimum loss.* Thanks to those same "walking wheels," loads don't do much bouncing in the body of a '61 Chevy truck. That means you don't have to contend with undue cargo damage that eats away at your earnings. (Chevy's load-tailored *rear* suspension helps protect cargoes, too.) This sure protection for fragile loads—and profits—is standard in 1961 Chevrolet trucks of every weight class.

3 *Rides drivers through with less fatigue—for tighter schedules.* Wait till you see how Chevy front wheel action works to eliminate tiring shimmy and steering-wheel fight. It means that the man at the controls can stay there longer with less fatigue—stay on schedule and do a bigger day's work. (Another reason you can look for faster schedules is that Chevy's bump-beating wheel action allows faster safe speeds on rough roads.)

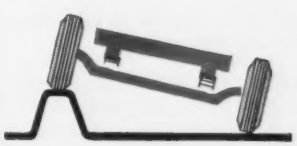
That gives you an idea of how Chevy Independent Front Suspension works to move you ahead in the money-making department. And it's available in 165 Chevrolet models for '61, from new Corvair 95's to 36,000-lb. GVW tandems. Check it out with a demonstration ride at your Chevrolet dealer's, sometime soon. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

INDEPENDENT FRONT SUSPENSION



In Chevy, each front wheel, suspended independently, is free to step cleanly over bumps (see left). Each works smoothly to reduce objectionable jolts so characteristic with I-beam axle design (right). Working with load-tailored rear suspensions in every weight class, I.F.S. provides the basis for profit-protecting performance that's unmatched by I-beam axle trucks.

I-BEAM AXLE DESIGN



1961 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

The Clay Pipe Industry's research has pioneered dramatic new developments, making production and installation of lifetime Vitrified Clay Pipe more efficient and effective.

For example, Clay Pipe Industry research discovered the revolutionary resilient compression joints which are now offering important savings in installation time and cost to users of lifetime Vitrified Clay Pipe sanitary sewers.

Other important tests are now going on at the Crystal Lake facility, by contract at colleges and universities all over the country, and at the modern laboratories maintained by individual Clay Pipe manufacturers.

One experiment that promises to have far-reaching effects: detailed, year-long observations of root penetration of 16 separate sewer pipe joints. Others include shear load studies of both pipe material and joints, development of new, less expensive jointing materials and techniques, exhaustive analyses of competitive products, flow-coefficient studies, and various tests aimed at improving the clay pipe itself.

Results of the most significant of these tests will be announced as they become available.

Under the direction of A. J. Reed, NCPMI Vice President and Director of Research, new breakthroughs in manufacturing and uses of Clay Pipe are being made, offering greater, more confident service to those who specify and use lifetime Vitrified Clay Pipe.

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. . . Reader Comment

Dams Are War Risks

SIR—Most projects dealing with water or power developing facilities call for high dams and great reservoirs. In my opinion we are rapidly creating a Frankenstein monster, which may be the ruination of the nation if we are drawn into a major war. With one well placed hit, it may be possible for an enemy to destroy an entire water and power generating system.

Isn't it time for us to call a halt to this type of project and make an effort to develop a system by which great amounts of electrical power can be generated underground?

ARNOLD A. ROSENFELD
McKeesport, Pa.

Technicians vs. Engineers

SIR—While Dean Stith's comments (ENR Oct. 20, 1960, p. 7) are of interest, your Editor's Note should appeal to engineers even more.

For the past few years various individuals have been waging a battle against engineers being termed technicians, as is presently officially done by some of our federal agencies, but all engineers should resent being removed from a professional level and relegated to that of laboratory helpers, electricians, beauticians, morticians and other expert craftsmen who, though highly respected in their fields, are not generally included in the same public service category as physicians, lawyers and other professional persons.

EDWARD K. BRYANT
Tippetts-Abbett-McCarthy-Stratton
New York, N. Y.

Something Missing

SIR—I read with great interest the excellent article "Fitting Cities to the Future" (ENR Oct 13, 1960, p 41). One glaring omission in the list of significant developments described is the project known as University City. University City, as a re-development project, has received active attention of the City Planning Commission and the Redevelopment Authority for more than a year.

University City aside, it was also surprising to find no mention of the tremendous construction program of the University of Pennsylvania and Drexel Institute of Technology—to mention the two most obvious cases.

LEO MOLINARO
West Philadelphia Corp.
Philadelphia, Pa.

Editor's note: ENR reported on the $150-million proposal for University City, which was formally announced too late for inclusion in the Philadelphia Report, in the Oct. 20, 1960, issue, p. 26. For a nationwide report on college construction see ENR Aug. 18, 1960, p. 34.

NEW ROCK-LOADING TEAM BOOSTS PLANT PRODUCTION 25%

Hauler: *13-ton Michigan Tractor Wagon* Loader: *2¾ yd Michigan Tractor Shovel*
Output: *2,400 tons daily on 2 mile cycle*

Four years ago, the Fort Scott Hydraulic Cement Company, Fort Scott, Kansas, began a program to replace their four crawler-loaders and two 10-ton tandem-axle dump trucks with the most modern equipment available.

The program was completed when a 13-ton rear-dump Michigan Tractor Wagon went on the job a year ago. Its addition gave Fort Scott, one of the nation's three major natural cement producers, an all Michigan fleet. The Wagon teams with a 2¾ yd Model 175A Michigan Tractor Shovel in the rock pit. Three other 2¾ yd Michigan Tractor Shovels handle the crushed rock, coal, and clinkers in this 4,500 barrel-a-day natural cement plant.

Tractor Wagon hauls 120 tons per hour

It's the heavy rock loading and hauling operation that Mr. Pat Thomas, president of the 92-year-old firm, points to as being the best example of how the Michigan machines have improved job efficiency.

Shot Florentine limestone is currently being loaded out of the far end of a pit 90 feet wide and 5,000 to 6,000 feet long. This makes the average haul cycle, between pit and crusher, about two miles.

The 162 hp Tractor Wagon's stability and speed of up to 31 mph is a prime production factor in the mile long *uphill* run from pit to crusher. With torque converter and full power shift, power and speed are instantly adjusted to match the load demand.

On two 10-hour shifts, the Tractor Wagon, sideboarded to meet rated capacity, and the highly-maneuverable 2¾ yd Tractor Shovel will load out an average 2,400 tons of rock . . . rock which weighs, when loose, approximately 2,500 lbs per cu yd.

2 Michigans outwork 3 units formerly used

Production in the rock pit has risen 25% since the Tractor Shovel replaced a crawler rig with similar bucket capacity, and the Tractor Wagon took over the job formerly handled by two 10-ton dump trucks.

Upkeep "phenomenally small," says president

"With all five of the Michigans working constantly with heavy loads and over sharp rock and abrasive cinders, *we have spent less than $2100 on overhauls, parts, tires and labor during the past three years*," says Mr. Thomas. "I think this figure is extremely low considering what a machine goes through in a cement plant operation of this type. We've had virtually no downtime."

If you're hauling bulky materials off the highway, perhaps a Michigan Tractor Wagon could increase your production, too. When you pair it with one of the eight Michigan Tractor Shovel models (up to 6 cu yds), you've got a team that can't be beat. Let us demonstrate. Just call. There's no obligation, of course.

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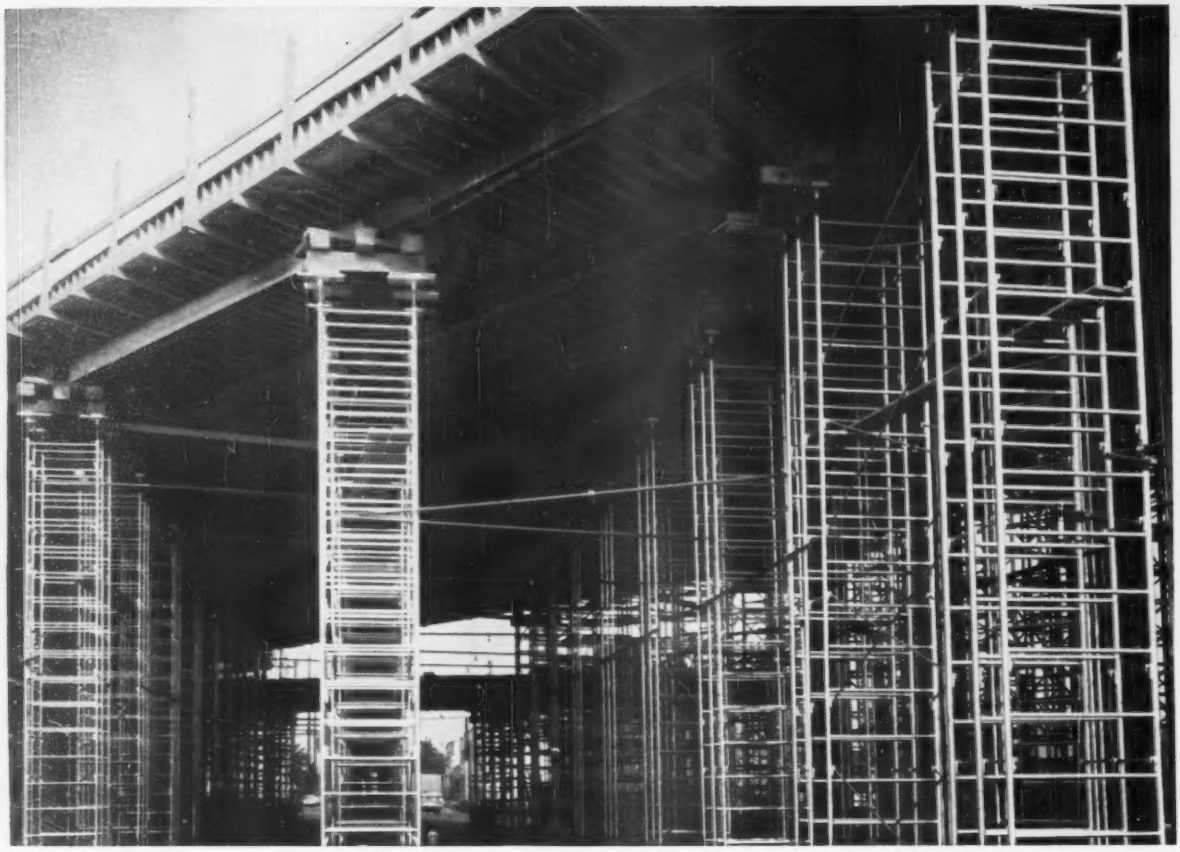

New Heavy Duty 20K Frames Shore 6-mile Freeway Access

BY MOVING a minimum amount of equipment only 19 times, the contractor, Griffith Company, is able to save considerable material costs on shoring work for the six mile Santa Monica viaduct section of a connecting Freeway near Los Angeles.

The design of the job involves a heavy concrete box girder system. To provide adequate support for this construction, PS Co.'s new heavy duty 20K "Trouble Saver"® Shoring frames are used. 9000 of these frames shore a section 850' long by 65' wide. Lift trucks move this same shoring equipment to adjoining sections of the same size. In this way the work is accomplished with minimum material.

Weight of the concrete box girders can be realized from these details: bottom slab is 5½" to 6½" thick; top 5" to 5½" thick; box depth is 4' to 5' and made in three pours. Overall viaduct height varies from 15' to 33'. A total of 13,900 20K frames was used on this project.

20K FRAMES of "Trouble Saver" Shoring are designed for heavy duty work in accordance with PS Co.'s high standards of safety and are tested under simulated field conditions—and proved on recent jobs, like this one—to safely support up to 10,000 lbs. on each leg. Frames are 4' wide, in 3'6", 5' and 6' heights. Legs are 2⅜" o.d. U-heads, sprockets, adjustable legs, base plates can be arranged in any manner, top or bottom. For complete details, write for Bulletin PSS-51.

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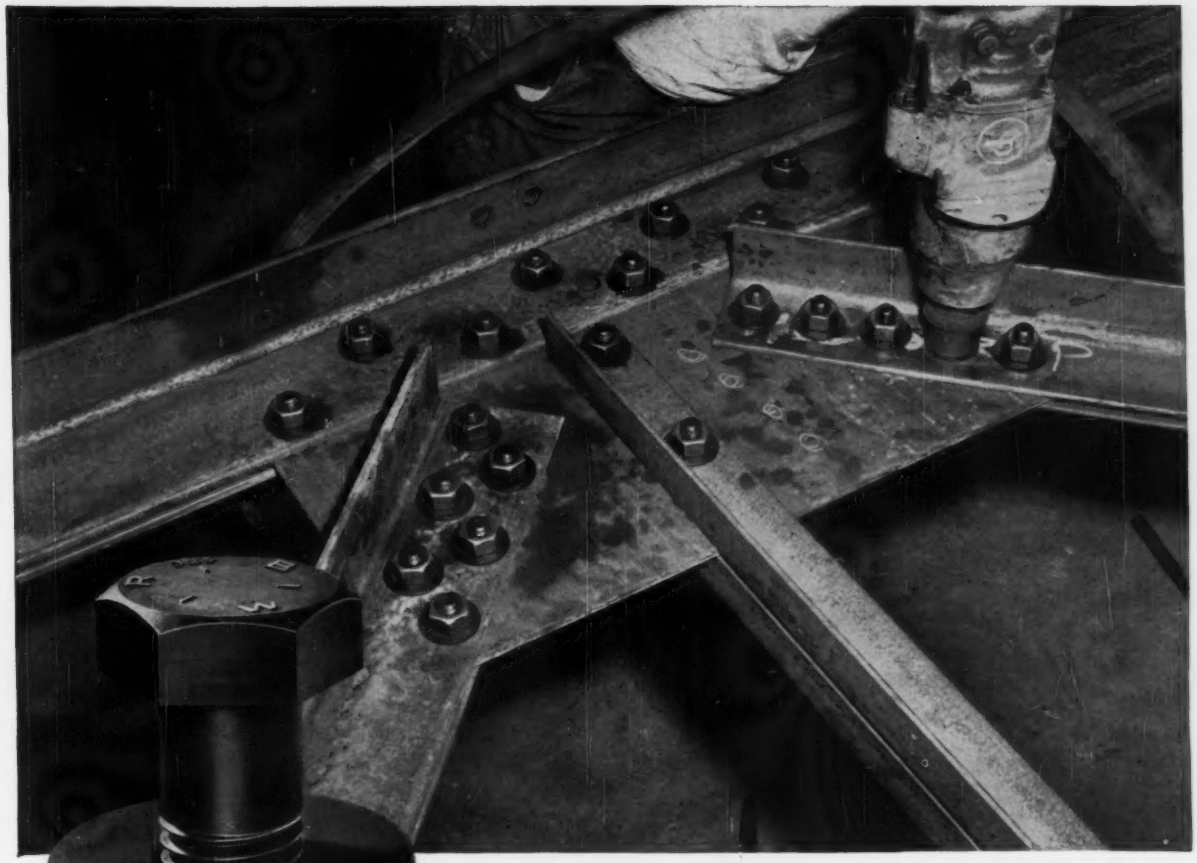

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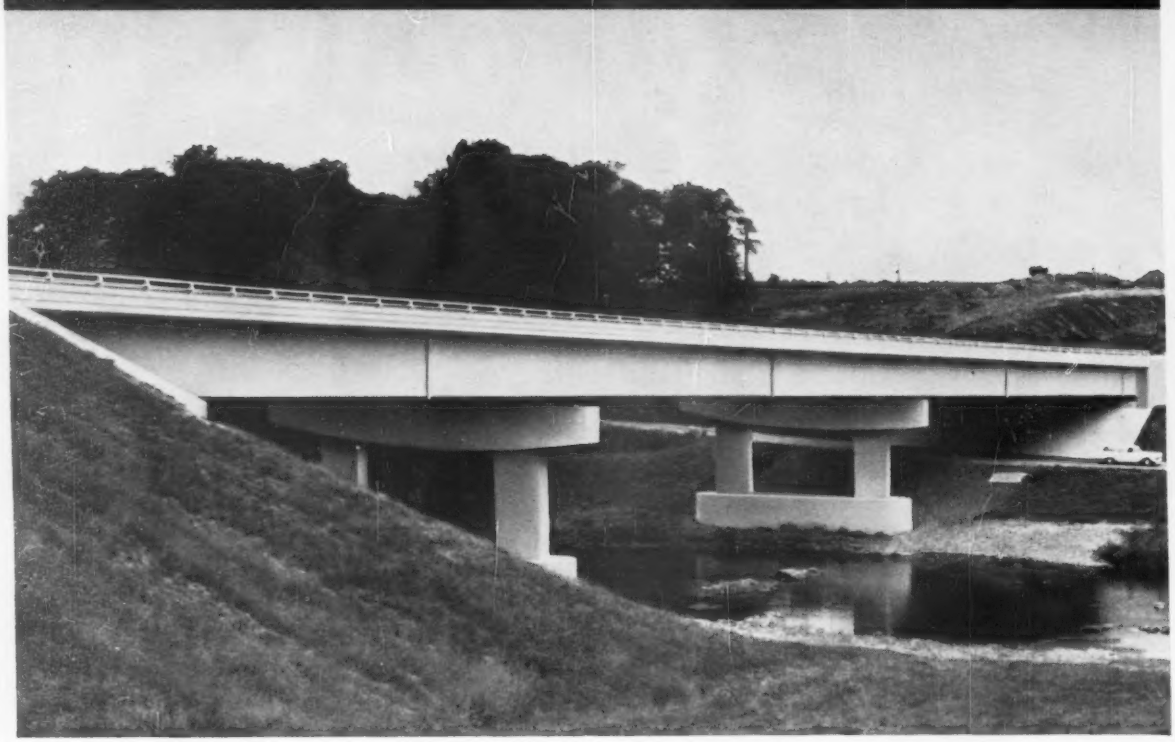

Box Girder Bridge over Kenduskeag Stream
Interstate Route 95, Bangor, Maine
Designers: The Clarkeson Engineering Company, Boston,
Consulting Engineers for Maine State Highway Commission
Contractor: Westcott Construction Company, North Attleboro, Maine

Of 14,703 bridges authorized for federal aid during the years 1957, 1958, and 1959, 2 out of 3 were reinforced concrete construction . . .

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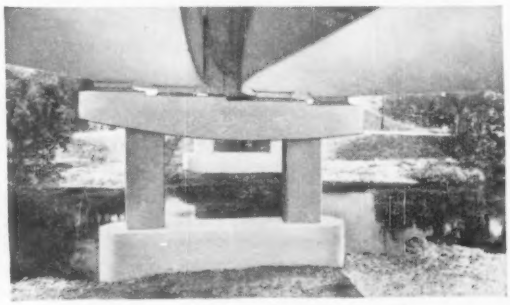

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WHO MAY ENTER Construction and practicing engineers, engineering faculty, graduate students, and undergraduates are eligible.

THE JUDGES Frank A. Marston, Partner, Metcalf & Eddy, Consulting Engineers, Boston, Mass.; William W. Moore, Partner, Dames and Moore, Consulting Engineers, San Francisco, Calif.; Jorj O. Osterberg, Professor of Civil Engineering, Northwestern University, Evanston, Ill.

"In order to be well prepared for his professional duties the young engineer should be thoroughly familiar with the present status of our theoretical knowledge in the field of foundation engineering, but it is equally important that he should be aware of the limitations of theory and the need for reducing the width of the gaps in our knowledge of the empirical aspects of the subject by conscientious observations in the field. In my opinion the Alfred A. Raymond Award is eminently suited to encourage such a mental attitude and to cultivate the precious gift of intellectual curiosity."—K. Terzaghi

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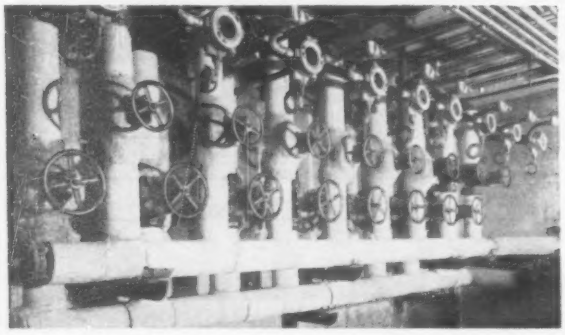

Jenkins Valves control lines from eight 30,000 gal. oil tanks.

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

FLORIDA BARS TWO MORE BUILDERS—The Florida State Road Board has barred two more contracting firms from bidding on state highway projects. The firms are W. L. Cobb Construction Co. and J. W. Conner & Sons, both of Tampa. The action follows testimony given at a Blatnik committee hearing that the two firms had made loans or gifts to road department employees (ENR Dec. 15, 1960, p. 35). Cone Brothers Contracting Co. had previously been barred from bidding for the same reason.

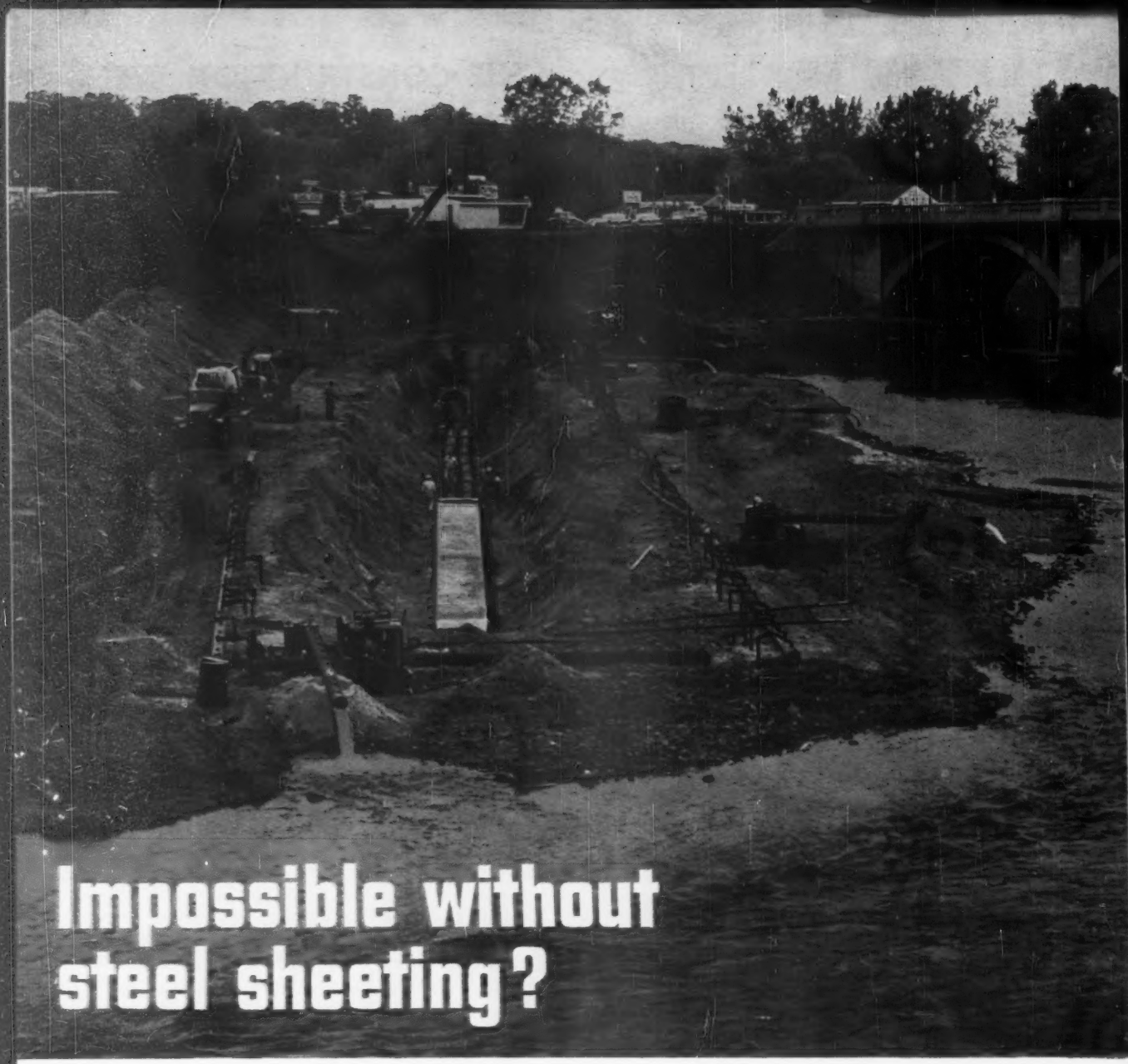
A36 OK'D FOR WELDING—A subcommittee of the American Society for Testing Materials has approved a revision of the A36 specification for structural steel that recognizes the steel's weldability when "suitable procedures" are used. (These procedures are substantially the same as for A373 steel.) However, the Bureau of Public Roads will not approve welding principal bridge connections of A36 steel until tests demonstrate that it is not notch sensitive or susceptible to brittle failure.

HIGHWAYS ON THE HOUSE—The Housing and Home Finance Agency will begin to pick up part of the tab for urban highways if a bill proposed by Sen. Clifford Case (R., N.J.) goes through. The Case bill is aimed at resolving disputes between the Bureau of Public Roads and state officials and residents over highway design. When local forces insist on a more expensive construction, HHFA would be able to pay two-thirds of the difference.

PLAY BALL ANYWAY—Total estimated cost of $17.8 million for New York City's new baseball stadium exceeds preliminary estimates by $1.6 million. Nevertheless, the state legislature and the City Council are expected to approve construction. P. J. Carlin Construction Co. and Thomas Crimmins Contracting Co., Inc., submitted low bid of $12.6 million for the general construction.

THIRST FOR SEA WATER—Along with calmer thoughts from Washington this week on U.S. water supply (President Kennedy, p. 26 and Sen. Robert S. Kerr, p. 21), comes a warning from a congressional outer space group, the House Science and Astronautics Committee, that the U.S. will probably face a critical water shortage by 1970. The great hope, as the committee sees it, is salt water conversion.

JUNGLE BUNGLE—Armed with pistols and rifles, a gang of bandits robbed the Brown and Root-Utah payroll tent at the site of Yanhee Dam, 250 miles north of Bangkok, Thailand. The bandits spoke politely to the paymaster during the robbery, shot a worker in the arm and made off with $30,000. But they overlooked $15,000 in the payroll tent and dropped $10,000 as they ran off into the jungle.



Impossible without steel sheeting?

This was the general opinion before the contractor, Hennessey Bros. of Cedar Rapids, Iowa, combined his construction know-how and Griffin dewatering experience. A double-barreled concrete-encased siphon was laid across the Des Moines River in record time. 13 million gallons per day were pumped continuously to provide a dry trench in coarse sand and gravel 16' below the river. By using the maximum volume Griffin Aquahog© wellpoints it was unnecessary to completely surround the work. Installation cost was held to a minimum.

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WASHINGTON OBSERVER

- **FTC probes price-fixing in steel, cement**
- **Labor referee for base disputes?**

● **Industry-wide price-fixing investigations are under way in steel and cement,** says Earl W. Kintner, chairman of the Federal Trade Commission. His disclosure, made in a New York speech, is considered a direct reply to a recommendation by James Landis that most of FTC's jurisdiction over anti-trust laws be given to the Justice Department. Jurisdictional disputes between FTC and Justice are not new. It is generally felt in Washington that Mr. Landis' comments, relayed to President Kennedy through a task-force report, simply bring new ammunition to an old feud.

Mr. Kintner did not name the firms involved in the study, but let it be known that they are numerous. The inquiry is aimed at determining if steel and cement companies are complying with old FTC orders forbidding them from participating in price-fixing activities. Information gathered over the past year is being analyzed by FTC staffers.

Mr. Kintner said the agency is also giving "serious attention" to concentration trends in the building materials industry.

—

● **A missile base labor referee may be the result of a fact-finding report by former Labor Secretary James Mitchell** on a critical work stoppage last November at Cape Canaveral. The strike was at Saturn missile launching sites of the National Aeronautics and Space Agency.

An "urgent need" for better rapport between NASA, other federal defense agencies and the building trades unions at missile sites was found by the six-man investigating team, headed by Acting Labor Department Solicitor Harold C. Nystrom. In this respect, the report says, a missile base labor referee "would accomplish immeasurable good."

No specific job-assignment recommendations are included in the report. But it does say that NASA should "continually re-examine" the point at which NASA research and construction work meet "with a view to contracting out more of the work. . ."

The Saturn work stoppage followed union charges that NASA specialists were assuming work usually handled by craft union members. The investigating committee was composed of Defense officials and representatives of the unions involved in the dispute—the United Association (plumbers) and the International Brotherhood of Electrical Workers. It noted the complexities of the situation.

But craft unions are urged to continue work "without recourse to stoppages" while seeking solutions to disputes at local levels. If these efforts fail, the report says, locals should call on officials of their international unions to help find solutions before a strike.

ANNOUNCING

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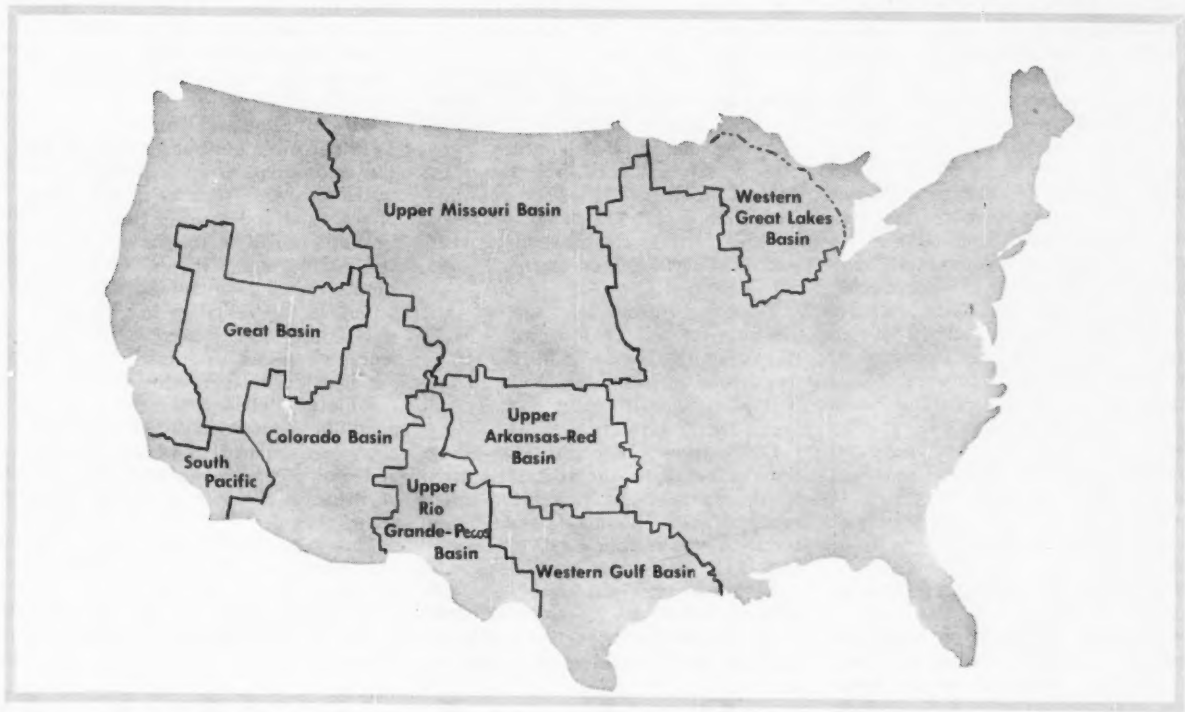


With eight areas pinched for water by the year 2000, there's a . . .

$200-Billion Tag on Kerr Water Plan

After two years of trying to sort out the nation's long-range water problems, the Senate bundled them up and tossed them into the White House last week.

The package was the long-awaited Kerr report on U. S. water needs through 1980, prepared by Sen. Robert S. Kerr's Select Committee on National Water Resources.

The document is much more general than had been anticipated. Nearly all specifics are left for the Administration to work out. But the report does lay down a broad framework for massive water research, planning and development that would cost close to $200 billion in federal, state, local and private construction by 1980. The report:

- Stresses the need for federal-state cooperation in water programs, and indirectly chides the states for not taking more active roles in such development.
- Calls for federal legislation to amplify and implement its various general recommendations.
- Tosses the ball to the White House for specific evaluations of water needs and plans, and for coordination and expansion of water research programs, within specific time limits.
- Sees no dire national water shortage, except in some regions, and emphasizes that these can be met.
- Looks to research to solve much of the nation's water squeeze.

Based on a 1954 determination that the nation's average daily stream flows total 1.1 trillion gallons, the report estimates that by the year 2000, about 81% of this water will be withdrawn from streams (888.4 billion gallons daily), but only 23% (253.2 billion gallons daily) actually will be consumed and lost (see table). The returned flows would still be available for re-use.

The pressure for added water development, says the report, will come from a two-fold population increase by 1980 and a three-fold hike by 2000; and there will be a ten-fold increase in water-related recreation needs. About seven million acres of new irrigated lands will be needed by 1980.

To face up to the problem, the committee makes the following recommendations:

- The federal government, cooperating with the states, should prepare and maintain comprehensive development and management plans for all major river basins. These plans should include prospective water demands, and also should include all non-revenue-producing purposes. Projects requiring congressional authorization should be related to these plans. The President should be requested, by January, 1962, to submit a program to Congress for completion of such studies for all basins by 1970.
- The federal government should set up a 10-year program of financial aid to states for development of comprehensive water plans—a minimum of $5 million yearly during the decade.
- The federal government should set up and coordinate a scientific water research program, and the President should submit such research plans to Congress before January, 1962, so that federal funds necessary to maintain the needed research could be placed in the fiscal 1963 budget. Research should include atmospheric physics, solar activity, groundwater movement and recharge hydrology, physical and molecular structure of water, photosynthesis, climatic cycles, desalinization, weather modification and forecasting, evaporation and transpiration reduction, waste treat-

ment, agricultural efficiency and fish and wildlife needs.

• The federal government should prepare biennial water supply and demand outlooks for each of the 22 water resource regions.

• The federal government, cooperating with the states, should "encourage" efficiency in water use and development through flood plain regulation, immediate studies of areas where water shortages will be most acute by 1980, and studies of needs for storage reservoirs.

These recommendations dovetail with Kennedy Administration plans to create a permanent White House council on national resources and policies. Sen. Clair Engle (D., Calif.) already has introduced such a bill (S-239) in Congress, and it has been referred to the Senate Interior Committee.

The Kerr recommendations were based on five conclusions:

• Stream flows must be regulated through additional surface reservoirs and watershed management.

• Pollution abatement programs must be increased to improve the quality of stream flows.

• Better use of underground storage should be developed.

• Increased efficiency of water use should be developed: ending of wasteful practices, improved sewage treatment, recirculation of water, increased irrigation efficiency, substitution of air-cooling for water-cooling in industry.

• Increase natural water yields through desalting, weather modification and other artificial means.

Costs of the program were outlined only in a general and vague manner by the committee, but it's fairly clear the Kerr group is thinking in terms of a $200-billion construction program through the year 2000—including government and private enterprise.

Various reports to the Senate group had made the following estimates of needed development costs by 1980: sewage and industrial wastes treatment, $42.2 billion; navigation, $2.5 billion; flood control, $11 billion; watershed protection, $1.8 billion; irrigation, no 1980 estimate, $22 billion by 2000; municipal and industrial water supply, $20 billion; storage reservoirs, $12.1 billion.

The committee points out that minimum 1980 storage additions, over 1954, for river regulation, must be 315 million acre-feet; the 2000 additions to storage, over 1954, must be 442 million acre-feet. Development of underground storage could reduce this, the committee adds, and such underground storage might be developed through nuclear explosions.

The committee calls its estimate of $81.6 billion for municipal and industrial sewage treatment "modest" when it is related to expected growth of the Gross National Product—GNP should hit $1.06 trillion by 1980, $2.2 trillion by 2000. "As the nation grows, larger and larger amounts can be made available for construction of waste facilities without detriment to the economy," states the committee.

Industrial water use will continue to grow, says the committee, but "industry is capable of adjusting to considerably smaller supplies through water conservation practices"—the major industrial problem is pollution. Pollution control through 1980 should be aimed at "the cheapest combination of waste treatment facilities and storage to provide sustained flows."

Since adequate water supplies are available for use on a national basis, the committee points out, the problem is one of using this water to the best advantage. It makes several comments on the subject:

Distribution problems—Increasing water use will require that total daily stream flows have a guaranteed minimum of 527.2 billion gallons (49% of average flows) in 1980; 699.7 billion gallons (63% of average) in 2000.

Regional water shortages have developed, and are developing. The South Pacific region already has reached maximum use of its available water supplies (see map); maximum use will be reached by 1980 in four other regions: Colorado River basin, the Great Basin, upper Rio Grande-Pecos River Basin, Upper Missouri River Basin. Three more regions will hit maximum use by 2000: the Upper Arkansas-Red River basins, the Western Great Lakes area, the Western Gulf Basin.

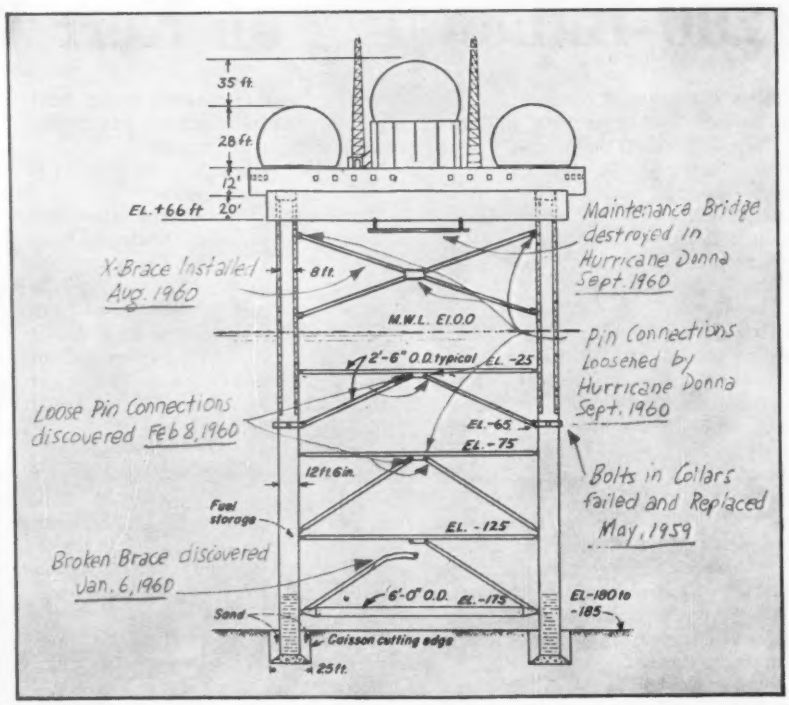
Most of these problems could be met by inter-basin water transfers, points out the committee, or from promising research programs such as desalinization of sea water and weather control.

Water quality—"In the past," says the Kerr group, "it was cheaper or simpler to go long distances for good water. In the future, it may be necessary to use local, poorer water." This requires research into methods of desalting and de-mineralizing of water.

Pollution—The committee defines pollution as sewage, insert materials, chemicals, sediment and heat. The biggest requirement is research into ways of reducing the cost of sewage treatment.

Flow variability—Water storage is the only answer to this problem; and the committee seems fascinated with possible underground storage reservoirs, possibly to be blasted out by nuclear explosions.

Broken Lower Brace



REPAIR LOG on Texas Tower No. 4 reveals two years of loose connection trouble in this west-facing framing, culminating in discovery of a broken member in the lowest panel of the bracing between the columns.

Flooding—Again, reservoirs are the basic solution, but the committee also feels flood plain regulations should be worked out by the states, including flood warning systems.

"Continued support for, and expansion of, these water management and research programs by the Congress is essential," the committee report concludes.

Hydroelectric power generation was scarcely touched by the committee. This use doesn't consume or divert water, so the committee only mentioned it in passing. Although no mention was made of federal, public or private power development, it's a safe bet that the Kerr committee's vast water development plans fit more readily into federal hydropower development through construction of federal multipurpose water projects.

"With the degree of river regulation that will be needed to provide for the nation's water needs in 1980 and 2000, there will be many opportunities for development of hydroelectric power," states the committee. "As there are alternate sources of producing electric power, however, the quantity of water needed for pollution abatement is assumed to be controlling" over power needs.

Use of U.S. Streamflows (billions of gallons daily)

Excl. Alaska and Hawaii

	1954		1980		2000	
	Withdrawals	Consumption	Withdrawals	Consumption	Withdrawals	Consumption
Irrigation	176.1	103.9	167.0	104.5	184.5	126.3
Municipal	16.7	2.1	28.6	3.7	42.2	5.5
Manufacturing	31.9	2.8	101.6	8.7	229.2	20.8
Thermal power cooling	74.1	0.4	258.9	1.7	429.4	2.9
Other	1.5	0.3	2.7	71.3	3.4	97.6
Totals	300.3	109.5	558.8	189.9	888.7	253.1
% Total flow	27	9	51	17	81	23

Capital Requirements for Water Projects (billions of dollars)

	1955				1980
FEDERAL	Invested	Deficiency	New Needs	Obsolescence	Total Needs
Navigation	6.9	1.6	3.4	3.7	8.7
Flood control	9.5	2.8	2.3	3.0	8.1
Hydropower	6.6	....	5.2	2.3	7.5
Irrigation	3.5	....	0.7	1.6	2.3
Industrial supply	10.1	....	14.6	3.7	18.3
Other	6.9	0.4	6.4	3.0	9.8
Federal totals	43.5	4.8	32.6	17.3	54.7
NON-FEDERAL					
Water supply	70.3	4.9	46.5	30.2	81.6
Hydropower	6.9	....	2.4	2.4	4.8
Thermal power cooling	3.5	....	5.9	2.1	8.0
Irrigation	10.0	....	1.9	4.8	6.9
Sewerage & wastes	42.7	16.5	23.8	30.2	70.5
Other	2.1	....	1.3	0.6	1.9
Non-federal totals	135.5	21.4	81.8	70.3	173.7
Grand total	179.0	26.2	114.4	87.6	228.4

Probable Key to Tower Collapse

A broken lower brace may have doomed the radar tower, which collapsed into the Atlantic 80 miles southeast of New York on January 15 with the loss of 28 lives. This broken brace, not discovered until January 6, was the most serious of a series of mishaps that began in September, 1958—within a year after the tower was completed.

The nature and extent of the damage is supplied in a log of the repair operations undertaken, which has been released by the Air Force after a period of secrecy extending back to the time of Hurricane Donna last fall (ENR Jan. 19, p. 23 and Jan. 26, p. 28). Most of the damage to Texas Tower No. 4, as it was called, occurred in the west face bracing between the two of its three legs which supported the bulk of the weight of the radar equipment.

The first mishap, in September, 1958, at the time of Hurricane Daisy, was the failure of bolts in the collars that connected the top panel of diagonal bracing to the tower legs in this west face. These collars and the top panel of bracing had been installed under water after the tower had been placed. They replaced a set of pin-connected bracing, like that in the lower panels, which unexpectedly had to be removed in order to float in the superstructure deck prior to its raising to the top of the tower legs. In removing the bracing it had been dropped and lost, so a new set had to be fabricated. Collar connections were adopted as easier to make under water than the original pin connections. Because of high seas, replacement of the collar bolts was delayed, and the work was not completed until May, 1959.

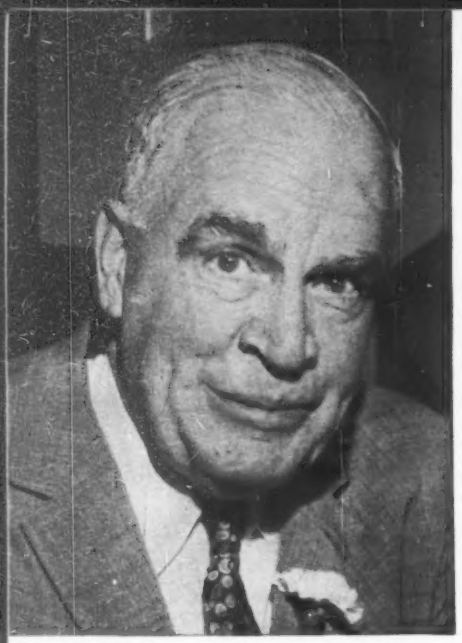
Between August and November 1959 the tower personnel noticed excessive movement in the platform, and a project was approved to tighten the bolts and do other repairs that inspection might reveal as necessary. One of these inspections, on Feb. 8, 1960, showed that the pins connecting the diagonal braces to the horizontal struts at the minus 25 and minus 75 levels on the west side of the tower were worn to such an extent that a maximum movement of 1 in. was possible. The collar connections were found to be tight.

To stiffen the tower against sway from these loose pins, it was decided to install a panel of X-bracing between the legs above the water line. This was accomplished by August, 1960, and before Hurricane Donna struck the tower with winds that were clocked at over 100 mph and with waves that carried away a maintenance bridge 65 ft above the normal level of the sea. This bridge, which was necessary to service the divers, could not be replaced until November.

The known damage from Hurricane Donna was further loosening of the connections of the diagonal bracing to the horizontal struts at the minus 25 and minus 75 levels, and wear and loosening of the connections in the new X-bracing above water level.

An inspection deeper down was not made until Jan. 6, 1961, when the broken brace at the minus 175-ft level was discovered. The decision was then made to evacuate the tower by February 1, and to postpone repair operations until better weather next May. A vicious winter storm struck the tower on January 15, and it collapsed.

These are believed to be the basic facts that an Air Force investigating board has to go on in determining the cause and manner of failure. Involved also in the investigation are the Navy's Bureau of Yards & Docks, which was the Air Force's contracting agency for construction of the tower; Moran, Proctor, Mueser & Rutledge, New York, and Anderson-Nichols & Co., Boston, the consulting engineers; and J. Rich Steers, Inc., New York and Morrison-Knudsen Co., Boise, Idaho, the contractors. The tower was fabricated by Continental Copper and Steel Industries, South Portland, Me.



Commerce Secretary, Luther Hodges

Luther Hodges says . . .

Keep Roadbuilding in

Luther Hodges, the new Secretary of Commerce, has hardly got the seat of his office chair warm. But already he's battling to hold on to control of the Interstate Highway program and other federal-aid roadbuilding.

A new Cabinet unit, a Department of Transportation, was recommended by Dwight D. Eisenhower in his last days as President.

James Landis, a special consultant to President John F. Kennedy, wants an agency to co-ordinate national transportation policy to be attached to the White House.

Secretary Hodges announced his strong opposition to both these proposals last week and said he hoped that President Kennedy would also reject them.

"Many people think that any time there is a problem in government that a new agency is the solution," said the former governor of North Carolina.

Creation of new government units is usually a bad thing, he went on, because it adds to the cost of government and because these problems can frequently be handled by existing government organizations.

The Commerce Secretary plans to bolster his department's hold on federal-aid highway construction by doing a better job of "selling" the American public on the need for the Interstate and other road programs.

Transportation Chief Is Willing to Learn

President Kennedy has selected as his chief adviser on transportation policy a political ally with a varied business background but no experience in transportation and no expert knowledge of its problems.

The President's choice for Undersecretary of Commerce for Transportation is Clarence D. Martin, Jr., 44, of Los Angeles, a businessman with a wide range of holdings that include an automobile dealership, real estate developments in California and Arizona, farms in Washington and securities investments.

In his new post, Mr. Martin will supervise, among other things, the Bureau of Public Roads and have a big voice in formulating policy on highway development.

In choosing Mr. Martin, President Kennedy rewarded the man who was the Democratic party's chief fund-raiser during the presidential campaign. Mr. Martin served as deputy chairman for finance of the Democratic National Committee. He also managed Mr. Kennedy's preconvention drive for the Democratic presidential nomination in southern California. Mr. Martin is the son of a former Washington governor.

Sources close to the President said Mr. Martin's appointment was more than a political reward. They said he was chosen because of his administrative ability and the fact that he has been removed from the bitter squabbles in which competing modes of transportation have long engaged. He replaces John J. Allen, Jr., former Republican Representative from California, who has returned to private law practice.

Clarence D. Martin, Jr.

Mr. Martin said he obviously lacked expertise in his new post but that he came to the job with no preconceived ideas, would surround himself with a staff of experts and would strive to develop policies leading to a coordinated, efficient national transportation system.

Besides advising the President on general transportation matters, Mr. Martin will have administrative control over four other Commerce Department bureaus in addition to BPR: the Maritime Administration, the Defense Air Transport Administration, the Coast and Geodetic Survey, and the U.S. Weather Bureau.

One of his most pressing immediate chores will be to help Treasury Secretary Douglas Dillon formulate the new Administration's position on future financing of the Interstate highway program. To complete the program on schedule by 1972 will require an additional $10 billion.

Congress will soon begin wrestling with the problem of whether new financing is to be provided or whether the program is to be stretched out. It also plans a review of whether the current highway tax burden is equitably distributed between users and non-users.

The financing problem is complicated by the fact that the fourth cent of the federal gasoline tax, which is earmarked for highway financing, is due to expire under present law June 30.

The Kennedy Administration in time may seek an expansion and upgrading of Mr. Martin's post. James M. Landis, a Kennedy adviser, has recommended that the post be removed from the Commerce Department, shifted to the White House and enlarged.

Mr. Martin, like President Kennedy and many of his appointees, is a Harvard graduate. After graduating with a B.S. degree in 1938, Mr. Martin attended the University of Washington Law School. He served in World War II as a Naval aviator.

Commerce Department

Mr. Hodges is casting about for a man to fill the No. 2 spot in the Bureau of Public Roads who can do just that. He thinks the duties of this official should consist not only of seeing that orders of Federal Highway Administrator Rex M. Whitton are carried out, but also of "interpreting the highway program public relations-wise," Mr. Hodges said.

The Commerce chief plans to select the No. 2 man soon and also to ask Congress to upgrade the job. He thinks the title ought to be changed from Commissioner to Deputy Administrator. This probably would involve a salary increase.

Ellis Armstrong, the former commissioner, got $17,500 annually. A deputy administrator would command a salary closer to Mr. Whitton's $20,000 a year.

The commissioner was boss of BPR until 1956. But the job of administrator was created in 1956 with the start of the Interstate Highway Program. Because running that program became the bureau's biggest job, the administrator became the bureau's top official.

The administrator is appointed by the President; the commissioner, by the Commerce Secretary.

In his first formal press conference since becoming Commerce Secretary, Mr. Hodges also made known his views on other matters relating to highway and transportation regulation.

- He feels the highway program should be completed by 1972 as scheduled but is not ready to commit himself on how to provide the extra financing needed for the job.
- He indicated that he planned to let die by not acting on them proposals of the billboard industry to double the size of those billboards allowed on portions of the rights-of-way of the Interstate highway system.
- He is concerned about scandals unearthed in the Interstate construction program in recent months and willing to review federal control of the program. But, he said, even if he had another 1,000 men in BPR, he couldn't stop someone from stealing something.
- He would like to see the Commerce Department get responsibility for administering the program of federal help for depressed areas, which the Kennedy Administration will try to push through Congress.

FAA Head Strong for More Airport Aid

Najeeb E. Halaby, the new boss of the Federal Aviation Agency, is expected to take a more liberal view toward federal aid for airport construction than did his predecessor in the Eisenhower Administration, Elwood R. Quesada.

President Eisenhower and Mr. Quesada long advocated that the federal government phase out its program of assistance to local communities for airports and prevailed upon Congress to reduce money for the program gradually.

In the final budget Mr. Eisenhower submitted to Congress in mid-January, he called for another cut in the federal authorization for the program—from the current $63 million to $40 million in the fiscal year starting July 1. The federal money is matched locally on a 50-50 basis.

Besides favoring gradual elimination of federal aid, Mr. Quesada also took a narrow view of how the money should be spent. He restricted federal aid for the most part to extension of airport runways and purchases of additional land for safety areas beyond runways.

Mr. Halaby will soon begin a review of the Eisenhower-Quesada budget for FAA-administered programs in the new fiscal year and, among other things, will decide how much of an increase in airport aid to recommend to President Kennedy.

Chances are that, though he favors a sizable increase, he will recommend a comparably small one. President Kennedy's budget chief last week instructed government agency heads not to seek big increases in the Eisenhower budget unless urgently needed.

Najeeb E. Halaby

The selection of Mr. Halaby, a 45-year-old Dallas-born lawyer and air expert, to head the FAA has been generally applauded both by pilots and airline management. Besides being Mr. Kennedy's chief adviser on aviation matters, he will be the promulgator of air safety rules and supervise the operation of the nation's air traffic control system.

In performing the latter tasks, Mr. Quesada was often at odds with Air Line Pilots Association, which looked upon him as somewhat dictatorial. Mr. Halaby is assessed as being as tough as Mr. Quesada in promoting and enforcing air safety, but is expected to be more diplomatic in his dealings with the union and the airlines themselves.

He is an experienced pilot, an expert on aviation and was secretary-treasurer of Aerospace Corp., in Los Angeles, a research firm that has advised the Air Force on ballistic missiles and space programs. He has been piloting planes since 1933 and once was a test pilot.

Ironically, Mr. Halaby might well have been the departing, rather than the incoming FAA Administrator. He served as vice chairman of the White House aviation facilities group in 1955-56, whose studies culminated in the decision to establish FAA to supplant the old Civil Aviation Administration. His name was proposed to President Eisenhower as the first administrator of the new agency, and the President was receptive to the suggestion.

But, Mr. Quesada, a long-time personal friend of Mr. Eisenhower, was then serving in the White House as an advisor on air matters. The President's decision was to switch Mr. Quesada to head FAA and to close out the advisory position.

Both the airline pilots and industry representatives wanted the top FAA spot to go to a man highly qualified with a technical background and first-hand knowledge of flying. Mr. Halaby, they believe, fits this bill.

Kennedy to Press Construction Program

President John F. Kennedy, in his State of the Union address to Congress, left no doubt that government-stimulated construction, at home as well as abroad, has an important place in his plans for the "New Frontier."

His message sketched in broad outline the plan of the new Administration; he promised to deliver to Congress soon 10 specific measures to improve the national economy, which, he reported, "is disturbing."

One of these messages will deal with government plans "to stimulate housing and construction," another "to increase the development of our natural resources," and a third "to offer tax incentives for sound plant investment."

President Kennedy found that "twelve long years after Congress declared our goal to be 'a decent home and a suitable environment for every American family,' we still have 25 million Americans living in substandard housing." To help meet this deficit, he said, "a new housing program under a new housing and urban affairs department will be needed this year."

Addressing himself to the nation's educational needs, President Kennedy stated his support for a federal program to aid public school and college construction. "Federal grants for both higher and public school education can no longer be delayed," he declared. He commented that American classrooms contain two million more children than they properly have room for, and the wave of war babies of the '40s is now descending on our "ill-prepared" colleges.

Two other "sore spots" as listed by the President were the saline water conversion program and the nationally dwindling supply of clean water (see p. 21).

Mr. Kennedy also commented that "a host of problems and projects in all 50 states, though not possible to include in this message, deserves—and will receive—the attention of both the Congress and the executive branch. On most of these matters, messages will be sent to the Congress within the next two weeks."

Painting a gloomy picture of America's position in foreign affairs, Mr. Kennedy asserted that "first, we must strengthen our military tools." In this process, Defense Secretary Robert S. McNamara has been instructed to reappraise the entire defense strategy, including the effectiveness, vulnerability and dispersal of our strategic bases, forces and warning systems, and the elimination of obsolete bases and installations.

Mr. Kennedy said he will ask Congress for authority to establish a new and more effective program for assisting the economic, educational and social development of other countries and continents.

The goal: "Construction of a sound and expanding economy for the entire non-Communist world, helping other nations build the strength to meet their own problems, to satisfy their own aspirations, and to surmount their own dangers."

The scope: "The problems in achieving this goal are towering and unprecedented—the response must be towering and unprecedented as well, much as Lend-Lease and the Marshall Plan were in earlier years."

For Latin America, Mr. Kennedy called for Congress to appropriate the full $500 million pledged by the Act of Bogota, to be used as a first step in the sound development of the Americas. The U. S., in cooperation with other Western Hemisphere nations, he said, should launch a new hemispheric attack on illiteracy and inadequate educational opportunities at all levels.

Canada to Make Better Structural Steel

The Algoma Steel Corp., Ltd. of Sault Ste. Marie, Ont., will start production soon of a new structural steel.

It will have a higher yield point than ordinary structural steel (American Society for Testing Materials Specification A7), A373 steel and even the new A36 steel in thicknesses up to 1 in. Yet, it is claimed to have greater weldability and better notch toughness.

The steel was developed especially to provide superior resistance to brittle fracture. It can be furnished with a transition temperature (above which brittle fracture is unlikely) as low as −139F.

Algoma's steel meets Canadian Standards Association Specification G40.8, approved last year. This calls for three grades of steel with controlled chemistry.

Minimum yield point ranges from 40,000 psi for material up to ⅜ in. thick down to 36,000 psi for thicknesses from 1 to 1½ in. Ultimate strength will be 65,000 to 85,000 psi.

Carbon content will be held to a maximum of 0.22% in Grade A steel, 0.20% in Grade B, and 0.15% in Grade C, to give progressively greater notch toughness. Manganese content will be limited to a minimum of 0.80%.

Grades B and C will be produced in accordance with fine-grain, killed steel practice. Silicon content will be restricted to a maximum of 0.35%, whereas no silicon limit is set for Grade A.

Algoma expects to charge an extra of about $4 per ton for Grade A. The extra for A36 is about $1 per ton. Thus, there will be a saving in using the new steel instead of A7, A36 and A373, since higher unit stresses generally will be permitted because of the higher yield point.

Weldability of the G40.8 steel is expected to be superior, based on a comparison of equivalent carbon content (see table). This is calculated by adding to the percentage of carbon one-sixth the percentage of manganese, one-fifth the percentage of chromium and one-fourth the percentage of molybdenum.

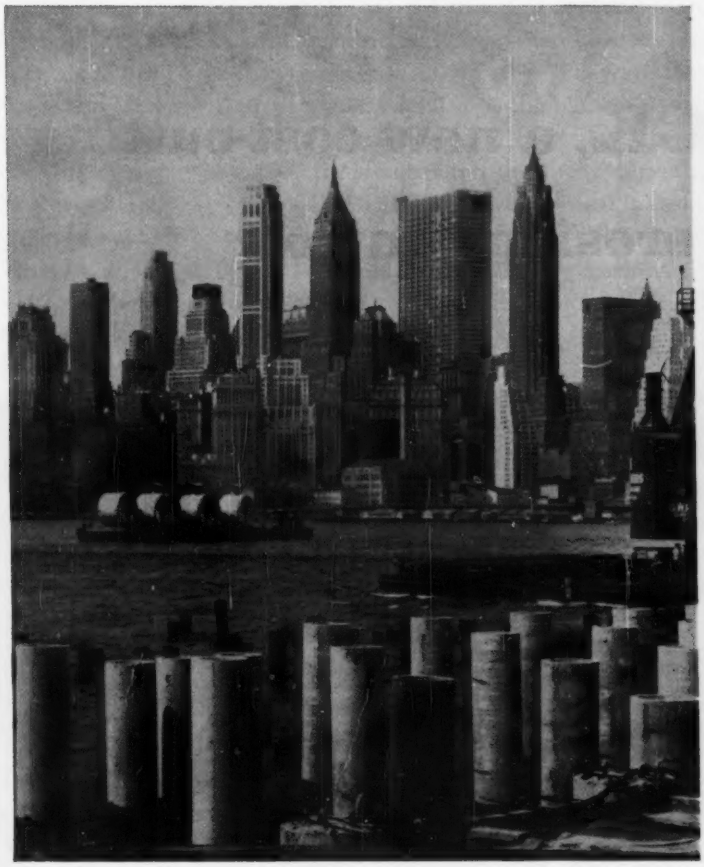
How Structural Steels Compare on Weldability

(Typical ⅝-in. Plate)

Specification	Calculated Transition Temp.	Weldability Equivalent Carbon	Minimum Yield Strength-Psi
G40.8 (Grade A)	−13 F	0.30	40,000
G40.8 (Grade B)	−65 F	0.28	40,000
G40.8 (Grade C)	−139 F	0.31	40,000
ASTM A7	+57 F	0.32-0.37	33,000
ASTM A373	+22 F	0.31	32,000
ASTM A36	+37 F	0.35	36,000
G40.6	+35 F	0.49	45,000
ASTM A440	−69 F	0.40	50,000
ASTM A242	a	b	50,000

Notes: a—Varies widely for different products—general range from +30 F to −60 F.
b—Varies widely for different products—most types range near a value of 0.30.

METROPOLIS OR MOUNTAIN TOP



PILE SLEEVE OR PIPELINE

LOCK JOINT PIPE COMPANY products for a variety of purposes are offered on a world-wide market. The majestic New York skyline looks down on a bargeload of 144″ Lock Joint Concrete Subaqueous Pipe en route to a metropolitan sewer outfall project, as well as on Lock Joint Concrete Pile Sleeves being installed for the Port Authority's pier construction program.

15,000 feet up on the bleak slopes of the Andes, the installation of 40 miles of Lock Joint Concrete Pressure Pipe made vital water available to the Southern Peru Copper Company's $300,000,000 mining enterprise.

So it is throughout the world. Lock Joint products are bringing fertility to the Negev Desert. Additional water flows to thriving Cape Town through a Lock Joint supply line. Lock Joint transmission and distribution mains as well as sewer lines help meet greatly increased demands in booming Caracas. These are only a few of the thousands of communities at home and abroad served with complete satisfaction by Lock Joint Pipe Company.

LOCK JOINT

CONCRETE PIPE

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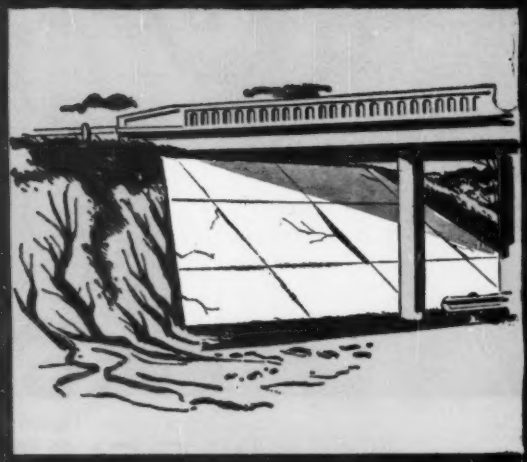
gb from Gustin-Bacon, a pioneer in fiber glass, comes

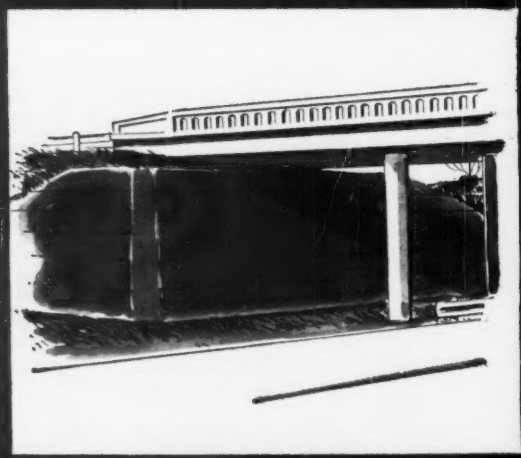
ULTRACHECK™, a new cost-cutting concept for soil erosion control

ULTRACHECK STOPS EROSION ON COUNTY ROAD

These "before" and "after" photos give dramatic proof of ULTRACHECK's ability to control erosion—even after all other practical methods failed and expensive annual re-grading had been necessary. Two and one half years later —completely stabilized with G-B ULTRACHECK and natural vegetation—this ditch now requires no maintenance whatsoever.

LOW-COST TREATMENT OF BRIDGE BERMS

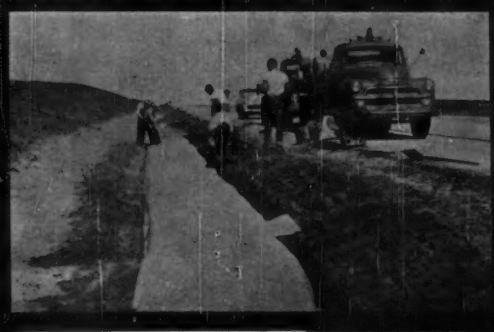




Besides reducing material and labor costs as much as 55%, G-B ULTRACHECK keeps bridge berms erosion-free with little or no maintenance required. Permanent as glass itself, G-B ULTRACHECK will not rot, corrode or deteriorate.

With G-B Ultracheck glass fiber blankets there is a more permanent, less expensive way to prevent erosion along highways, on bridge berms, on large construction projects, or wherever earth has been moved, replaced or stripped of vegetation. G-B Ultracheck is made exclusively of long, high-strength glass fibers, permanently bonded together in 1″ thick blankets. Continuous 100-foot blankets, in widths up to 6′, simply roll over the erosion susceptible area. They are then toed in, pinned down and forgotten! For added strength, asphalt may be applied to the blanket's surface. Because G-B Ultracheck offers no resistance to vegetation growth, grasses and other vegetation begin immediately to grow through the glass fibers. Soon the entire area is completely lined with vegetation, assuring permanent, maintenance-free protection against erosion. G-B Ultracheck is economical to install, too. Experience to date indicates it can be applied for between $1.00 and $2.00 per sq. yd. (a few cents higher if treated with asphalt)—a savings of 55% as compared to concrete. G-B Ultracheck has been proved by years of extensive testing under actual conditions with the cooperation of state highway officials. Several of these actual case histories are shown below.

TREATMENT OF SUPER-HIGHWAY DRAINAGE SYSTEMS IS FASTER, MORE ECONOMICAL



Manufactured in 100-ft. rolls, in widths up to 6 feet, G-B ULTRACHECK is ideal for the side lining of drainage ditches where erosion endangers the shoulders of a highway.

ULTRACHECK-LINED FLOOD CONTROL DIKES REMAIN EROSION-FREE

Even when subjected to tremendous volumes of water, G-B ULTRACHECK glass fiber blankets do not wash out. Witness this flood control dike where G-B ULTRACHECK effectively channels water at a sharp 90° angle.

OTHER APPLICATIONS: Lining of sewer lagoons; protection of earthen dams against wave action; temporary erosion protection at construction sites; flumes; drainage ditches; irrigation canal lining, etc.

Gustin-Bacon engineers are eager to consult with builders, contractors and engineers who have particular erosion problems. ULTRACHECK may provide a solution. For your free copy of a fully-illustrated brochure giving additional case histories and application specifications, write today.

GUSTIN-BACON Mfg. Co. gb

226 W. 10th St., Kansas City, Mo.

Wright's Last Job Resumes After Eight-Day Stoppage

The controversial Marin County, Calif., Civic Center, one of the last major works designed by Frank Lloyd Wright, is once again under construction after an eight-day work stoppage.

County Board of Supervisors voted early this month to stop work on the $3.6-million first phase of the project—ostensibly to see whether the structure could be converted into a hospital. However, a San Rafael architect, who was requested by the Board of Supervisors to study the plans, subsequently said that such a change was not feasible either economically or architecturally. This opinion plus citizen pressure brought a unanimous vote to resume construction.

The Civic Center has been a center of controversy ever since it first was proposed in 1952. Controversy originally hinged on whether or not the county needed a center at all. After architect Wright was commissioned to plan the building, the opposition attacked the expensive design.

Estimated cost of the entire project is $10 million. About $1.6 million worth of construction already has been completed.

The 540-ft-long administration building is now under construction; it will be precast, prestressed concrete with arched concrete-covered steel walls hung as sunshades at the cantilevered edges of the floors.

Also to be erected are a domed civic auditorium, a health and welfare building, and a three-acre fair pavilion with a 3,000-seat auditorium.

The project is being financed on a pay-as-you-go basis over a 10-year period.

First-stage builder is Rothschild, Raffin and Weirick of San Francisco.

Lyons Named Oklahoma Director of Highways

Frank Lyons, 34, senior engineer with the Missouri State Highway Department, has been named Director of Highways for Oklahoma. He will replace Gen. Lee B. Washbourne, who recently resigned (ENR Jan. 26, p. 32).

Mr. Lyons will be one of the youngest chief state highway administrators in the country. A 1950 graduate of the Missouri School of Mines at Rolla, he has been with the Missouri department 10 years. Mr. Lyons is experienced in several phases of highway engineering; his last assignment was in the Division of Surveys and Planning.

Missouri Gov. Howard Edmondson said the new director was recommended highly by Rex M. Whitton, new Federal Highway Administrator and former Missouri chief engineer.

Around the Country . . .

• **On the bias**—The Colorado Department of Highways has awarded a contract for 14 miles of concrete pavement with diagonal transverse joints. Each joint will be cut 5 ft off right angles to the centerline to eliminate the bump caused when two wheels of a car hit a joint simultaneously. Comparatively rare in American highway practice, it is the first use of diagonal joints in Colorado.

• **Rebuilding theme**—Harvard economist John Kenneth Galbraith, author of "The Affluent Society," will keynote the American Institute of Architects' 1961 annual convention to be held in Philadelphia from April 24 to 28. "Redesigning Urban America" is the convention theme.

• **Hospital to straddle tracks**—Another indication of the trend to utilization of air rights over railroads is a proposal to construct a six-story medical building over the Shaker Heights Rapid Transit tracks in Cleveland, Ohio. Investors in the $1.8-million venture include a group of physicians. The structure would be constructed on a 640-ft-long concrete and steel span atop the below-street-level tracks.

• **Gradual approach** – Pittsburgh's Fort Duquesne Bridge, which was completed last summer, except for a means of getting on and off it, finally is sure of getting a set of approaches. A recent Pennsylvania Public Utility Commission ruling permitting uprooting of trolley tracks gives the go-ahead for the Point Park approach. A BPR decision in December freed action on the other approach.

• **Reaching for a record**—The Bureau of Public Roads estimates nationwide receipts for highways will reach nearly $12 billion this year. Construction expenditures (excluding right-of-way, but including engineering costs) are expected to total nearly $6 billion, compared with $5.5 billion last year and $5.9 billion in 1959.

• **Southwest center**—A proposal to build a $20-million convention center in Phoenix, Ariz., would include a 10,000-seat auditorium, a 300-unit motel, a professional building, and commercial and recreational facilities. Kent Organizations, Inc., Los Angeles, is the developer.

• **Kaiser gets Iran job**—Kaiser Engineers and Constructors, Inc., Oakland, has been appointed by the Steel Corp .of Iran to assist in planning and building proposed steel plant facilities.

• **Tracks for potash**—The Denver and Rio Grande Western Railroad will spend an estimated $5 million to build a 40-mile track from its main line in Utah to a $25-million potash plant now under construction at Moab, Utah.

• **Prequalification limit upped**—Contractors no longer need prequalification to bid on California State construction projects costing less than $50,000. The California Department of Public Works has just boosted its limit from $5,000 to $50,000 for both state highway and building projects.

• **Expanding museum**—George Hyman Construction Co. of Washington, D. C., has won a $7.7-million contract for addition and renovation of the national capital's Smithsonian Museum of Natural History. Architects are Mills, Petticord & Mills of Washington. A $24-million building for the Smithsonian's Museum of History and Technology is now under construction.

• **Expressway OK**—Bureau of Public Roads approved plans for the $140-million, 15-mile section of the $300-million Delaware Expressway. The section will run from East Philadelphia to the city's southwest boundary and require demolition of 1,140 homes and 762 industrial and commercial properties.

• **Urban freeways for Alaska?**—Consulting engineers Whipple, Murphy, Pearson and Associates of Seattle will conduct a study of freeway requirements in the vicinity of Anchorage for the Alaska Department of Public Works. Included will be a detailed analysis of a proposed 12.5-mile freeway net.

• **Kentucky geology study**—The Interior Department and the State of Kentucky plan a joint $12-million geologic study of that state over the next 10 years. As many as 70 geologists will be working to turn out multicolored geologic maps of the entire state.

In CANTON, OHIO*

TYLOX

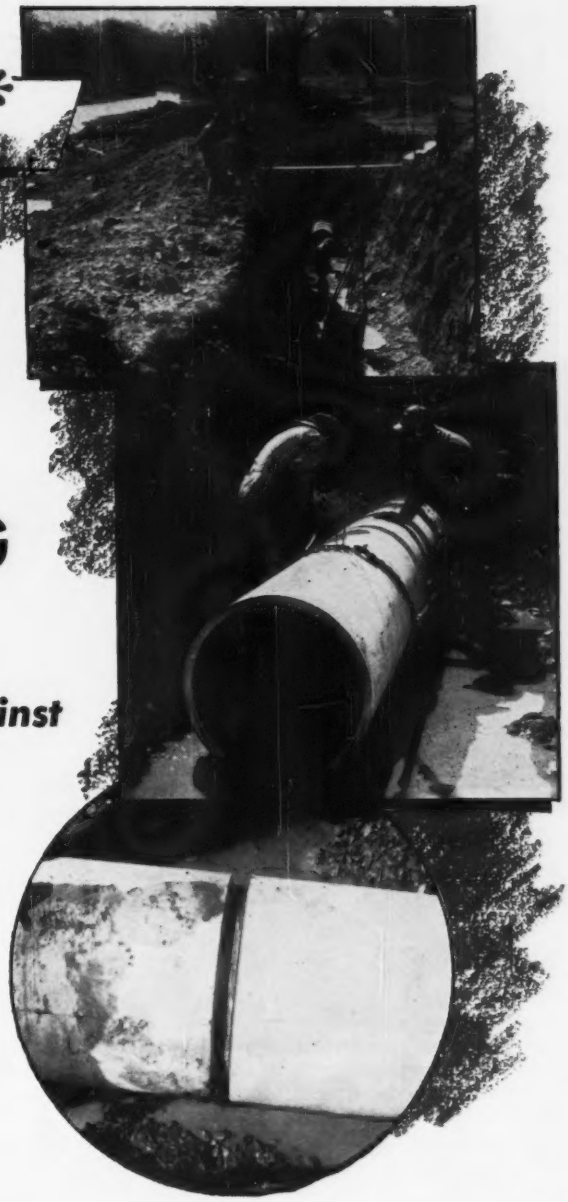
RUBBER PIPE JOINTS

and

REXON PIPE COATING

"team up"

to prevent leaks and guard against corrosion of new city sewers



Engineers had their eyes on future as well as present costs when they designed Canton's recent sewer expansion project. Here's how their call for TYLOX-jointed, REXON-coated concrete pipe helps assure Canton citizens of "most for the money" from their tax dollar . . .

NO JOINT LEAKS – even under tough conditions like those shown in the top photo. TYLOX prevents infiltration . . . keeps treatment plant loads at a minimum . . . eliminates root and sediment penetration.

NO ACID ATTACK – even though industrial wastes may enter the line. REXON Coating (center photo) is resistant to virtually all acids, alkalies, greases and solvents. "Teamed up" with equally durable TYLOX Joints, the resulting line is corrosion-resistant *throughout*.

FAST PIPE-LAYING – Just shove gasketed pipe home (lower photo) and the TYLOX Joint is complete. Wet trenches do not delay the work, and the *flexible* TYLOX permits immediate backfilling.

* **PROJECT:** Stark County sewer expansion project, Canton, Ohio
ENGINEER: A. T. Holl, Stark County Sanitary Engineer
CONTRACTOR: Shullo Construction Co., Akron, Ohio
PIPE: Reinforced concrete, TYLOX-Jointed and REXON Coated, manufactured by United States Concrete Pipe Company, Cleveland, Ohio.

5062-3

Plan now to specify TYLOX Rubber Joints and REXON Pipe Coating on your next concrete pipe job and be assured of leakproof, corrosion-resistant lines laid faster . . . Write for more details today.

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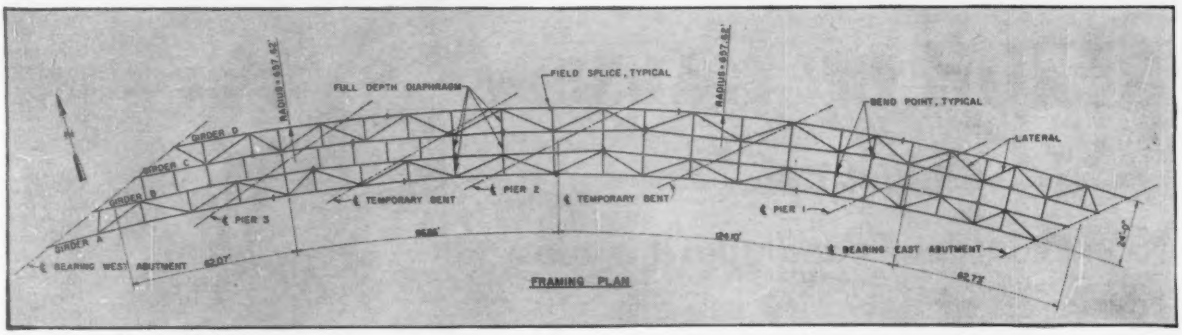
Shear connectors tie the deck to the girders.

Curved girders present smooth appearance.



Framing plan indicates location of falsework bents, diaphragms, lower lateral system.

Curved Girders Please Eye and Budget

By Wilbur Black and Robert Kao

Curved exterior and straight interior girders of a new Milwaukee Expressway bridge combine aesthetic design and construction economy.

Engineers for the first of four proposed bridges in the Stadium interchange faced several hurdles. They had to devise a framing system that closely paralleled the roadway curvature, pleased the eye and yet stayed within economic reason.

The bridge has four continuous spans for a total length of 345 ft. Each of the outside spans is 62 ft long; the two interior spans are 97 and 124 ft. Main elements of the superstructure are the two exterior and two interior welded girders. Stub abutments and pedestal columns make up the substructure.

The bridge is designed for composite action. Had it been made entirely of reinforced concrete, the slab and girders could have been formed to roadway curvature. In steel construction, though, the common practice is to place straight girders on chords between supports or between bend points located near the dead load inflection points. In this instance—where there is a 9-deg horizontal curve—the contractor used curved exterior girders and maintained a uniform distance from the girder to the edge of the slab. This treatment resulted in simpler deck forming and pleasing appearance.

Aligned on a skew angle of 60 deg, the bridge's roadway is 24 ft wide. Nelweld stud shear connectors in the areas of positive moment tie the deck to the girders. Between the girders are full-depth diaphragms and a lower lateral system. Horizontal stiffeners are located on the outside faces of the exterior girders.

To eliminate handling difficulties during shipping and to provide rigidity, each exterior girder was shop-assembled to an adjacent straight girder. In erection, workmen welded all splices. Each tension splice was inspected by radiograph. The girders were cambered for dead load deflection, superelevation and vertical curvature.

To increase the torsional effect due to the dead load, the contractor supported the two interior spans with temporary falsework. Jacks placed on these temporary supports adjusted the girders to computed elevations before deflection due to the weight of the concrete. The falsework was left in place until the concrete deck cured. This allowed the slab and lower lateral bracing to resist torsional moment.

In computing dead load deflections, design engineers considered the girders and slab to be non-composite while the slab was being placed and composite when the falsework was removed. The Wisconsin State Highway Commission, in charge of construction supervision, made deflection readings of the framing before and after the slab was placed and also after the falsework was removed. The maximum girder deflection was $1\frac{3}{8}$ in., while the greatest variation between computed and measured deflection at any point was $\frac{1}{4}$ in.

Howard, Needles, Tammen and Bergendoff, Kansas City consulting engineer, designed the bridge for the Milwaukee County Expressway System. The contractor was Woerfel Corp., Milwaukee. Resident engineer Donald Gostomski represented the Wisconsin State Highway Commission.

Mr. Kao is a bridge engineer in the Milwaukee office of Howard, Needles, Tammen & Bergendoff. Mr. Black is a designer in the Kansas City office.

THE NEW LOOK

Here is the NEW LOOK in Construction Equipment. It is more automatic, more versatile, has more built-in precision than ever before. It is the new Blaw-Knox look. ■ It lets you do more jobs, more economically. ■ It sets new standards of reliability, the modern, automatic way. ■ See the automatic features, the rugged quality that lets you bid closer, work tighter, and make more money. ■ Take a NEW LOOK at Blaw-Knox!

BuKaneer Truckmixers — 4- to 10-cu. yd. drums with flywheel and front engine power take-off as well as separate engine drive. Four forward and reverse drum speeds. Simplified controls fore and aft. Air-electric drum direction control with drum Tachometer standard. Standard 125-gal. water tank overshoots cab for better weight distribution, is equipped with sight glass and measuring gauge. Options: pressurized flush systems, quick opening drum hatch, closed end drum, recirculating water systems, tank compartmentation.

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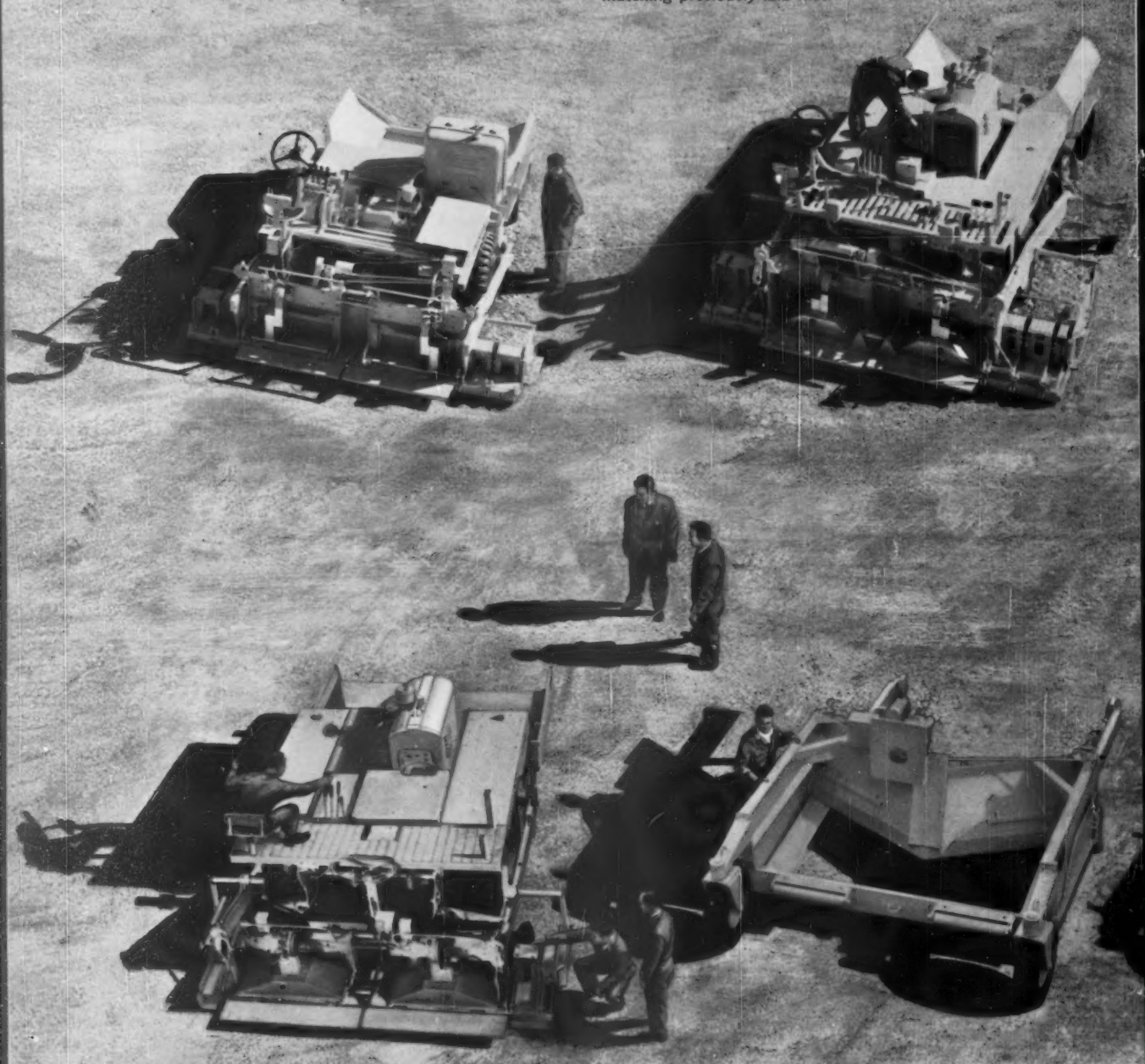
Universal Batch Control System (right)— Fully automatic cycling from preset mixes for simultaneous or cumulative batching using dial scales. Wide range of independent selector switches permits single material discharge without resetting. Locked formula panel for specification work. Can be equipped with digital or analog recording devices. System uses standard, readily available electrical components housed in dust-tight, drip-proof enclosure. Modular components make future expansion simple.

Uni-rect Design Batch Plants (far right)— Unitized, factory preassembled components make a wide variety of mix designs available in 2- to 8-cu. yd. automatic plants with 1 to 8 self-cleaning aggregate compartments, 1 or 2 150-barrel water-tight cement compartments. Two auxiliary cement compartments available. Equipped with 75-t.p.h. cement elevator. Complete plant shipped to you in factory assembled units for fast, easy erection.

Suburban Paver — Automatic control, 4-ton hopper, hydraulic folding wings. Right and left conveyors synchronized with augers. One piece screed with extensions to 12'. Full hydraulic wheel steering. Five paving speeds from 10 to 127 f.p.m. Travel speed 8.6 m.p.h. New hydraflated 10:00 x 20, 12-ply tires, and locking differential. Option: revolutionary new grade control for averaging out grade imperfections, adaptation to previously cut grade variations, and matching previously laid mat.

Express Paver—Automatic air-electric fingertip controls, 10-ton hopper with hydraulic folding wings. Independent control of left and right feed conveyors interlocked with control of augers. One piece screed design with extensions to 16'. Full hydraulic wheel steering. Eight paving speeds from 10 to 62 f.p.m. Travel speed 7 m.p.h. New hydraflated 10:00 x 20, 12-ply tires. Gasoline or Diesel power plant. Option: revolutionary new grade control for averaging out grade imperfections, determining grade from guide devices, adaptation to previously cut grade variations and matching previously laid mat.



Super Paver—Automatic, air-electric fingertip controls, 12-ton hopper with hydraulic folding wings. Independent control of left and right conveyors interlocked with control of augers. Automatic control of material level ahead of augers. One piece screed in 10' width with extensions to 15'. Hydraulically driven tamper. Full hydraulic wheel steering. Eight paving speeds from 16 f.p.m. to 117 f.p.m. Four forward and reverse travel speeds from 6 to 11 m.p.h. Drive wheels equipped with 16:00 x 25 low-pressure earth mover tires. Full power brakes. Gasoline or Diesel power plant. Option: revolutionary new grade control for averaging out grade imperfections, determining grade from guide devices, adaptation to previously cut grade variations and matching previously laid mat.

Base Paver Attachment—Big capacity unit designed especially for use with standard tractors of sufficient power. New universal hitch makes attachment easy. Equipped with its own engine-driven oscillating screed, and mechanical crown adjustment. Spreads stone, slag, gravel, soil, cement and plant mix aggregates 1" to 20" deep in widths from 10'-10" to 16'-0". Hopper lifts completely for travel.

Road Widener—Versatile, one-man unit spreads any kind of aggregate, lays all types of bituminous mixes, spreads and finishes concrete. Spreads aggregate and bituminous materials in 2′ to 10′ widths, spreads and finishes concrete in 2′ to 6′ widths. 15′ slip form attachment for concrete widening. Strike-off gate assemblies for each type material used. Spud vibrators for use with low slump concrete.

Sub-Grader—Revolutionary pushbutton power widening from 12′ to 28′. Automatic control system sets frame, conveyor and cutter bowl adjustment up to 4′. Easy-to-add sections readjust conveyor and cutter unit to 8′ to 12′. Entire range of depth adjustment made with synchronized electric power from 0″ to 12″. 14″ of height adjustment for form clearance at each end truck, independently or simultaneously. V-crown adjustment electrically controlled to within 3″. Parabolic crown hydraulically controlled. Electrically-powered travel speeds forward and reverse up to 40 f.p.m.

Self-Propelled Base Paver—Big capacity unit spreads stone, slag, gravel, soil cement or plant mix aggregates 1″ to 20″ deep in widths from 10′-10″ to 16′-0″, at the rate of more than 400 t.p.h. Tractor unit is equipped with 21″ wide crawler shoes for maximum traction and flotation on softest base. Equipped with high-speed oscillating screed, front wheel power steering, dual controls. Four forward and four reverse working speeds, one forward and reverse travel speed.

Concrete Spreader—Automatic transverse blade delivers spreading action regardless of where concrete is placed on subgrade without segregation. Machine available in two standard widths—10′ to 15′ and 20′ to 25′. Vibratory paving attachment available to compact concrete simultaneously with spreading action. Rubber-tire transportation wheels available for spreader and vibratory attachment.

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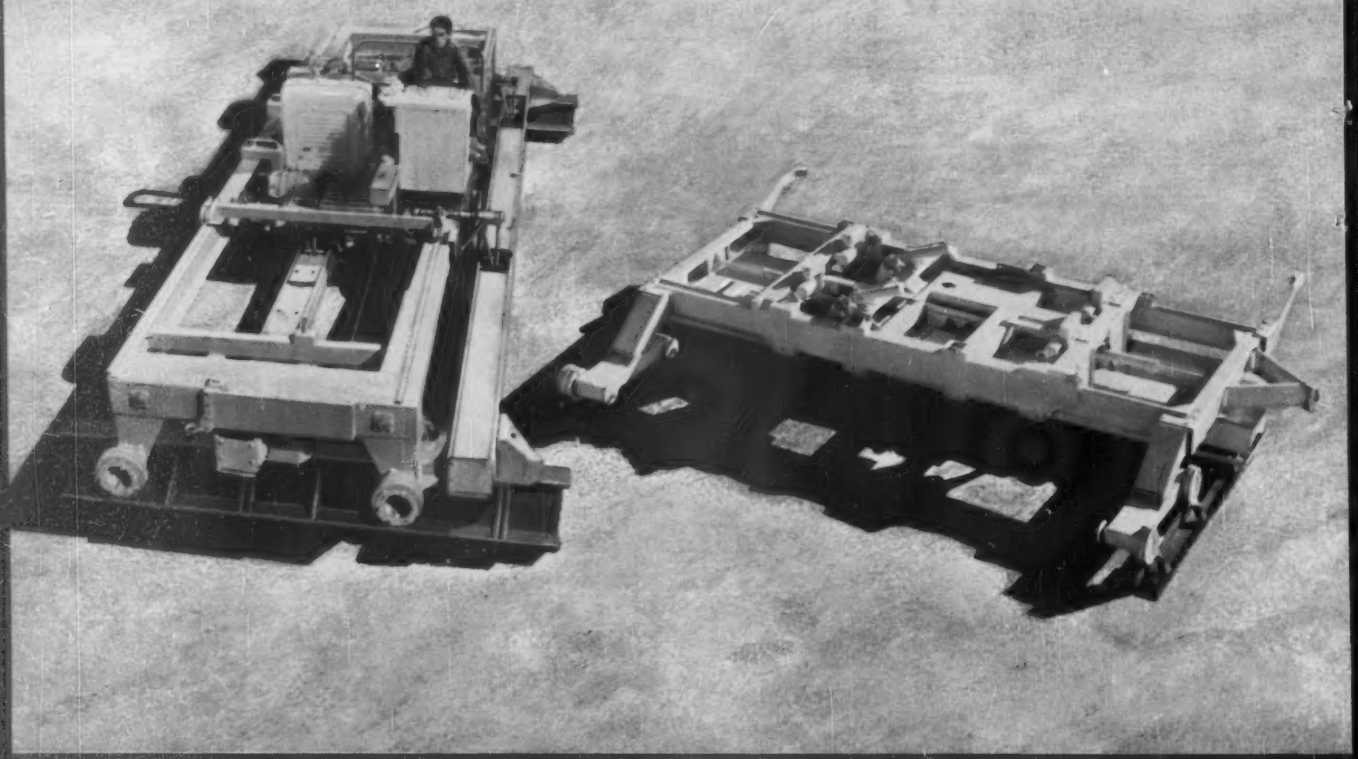
Finisher—Revolutionary pushbutton power widening from 12′ to 28′ without frame alteration in an infinite range of increments. Frame positions automatically without bolts or clamps. Screeds available in both crown bolt and quick adjustable types. Screed speeds infinitely variable between 40 and 105 strokes per minute, are controlled independently from traction speeds. Traction speeds infinitely variable between 8 and 80 f.p.m. through heavy-duty, high torque, variable frequency AC motors and gear reducers in each end truck. Power supplied by variable speed alternator driven by 4-cylinder engine.

Finisher Float—Revolutionary, pushbutton power widening from 12′ to 28′. Screed and pan-type float are quick adjustable for crown and operating position with synchronized electric power. Suspended oscillating screed is powered from Finisher through electric clutch and universal drive. Float is attached to Finisher and controlled through its own pushbutton controls mounted near the control panel of the Finisher.



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ON THE WAY: MORE OF THE NEW LOOK

Soon you'll see more Blaw-Knox Equipment with the modern, automatic features of the new look. For instance: a new self-widening, slip-form Concrete Paver, a batch handler for dual drum Concrete Pavers, a central mix Concrete Spreader, Mobile and Portable Batch Plants, all Aluminum, Hydrostatic-drive and trunnion-mounted Truckmixers, compaction rollers, centrifugal Concrete Mixers, and a new Hydroscoop. Keep in touch with your Blaw-Knox dealer for the latest information on the NEW LOOK.

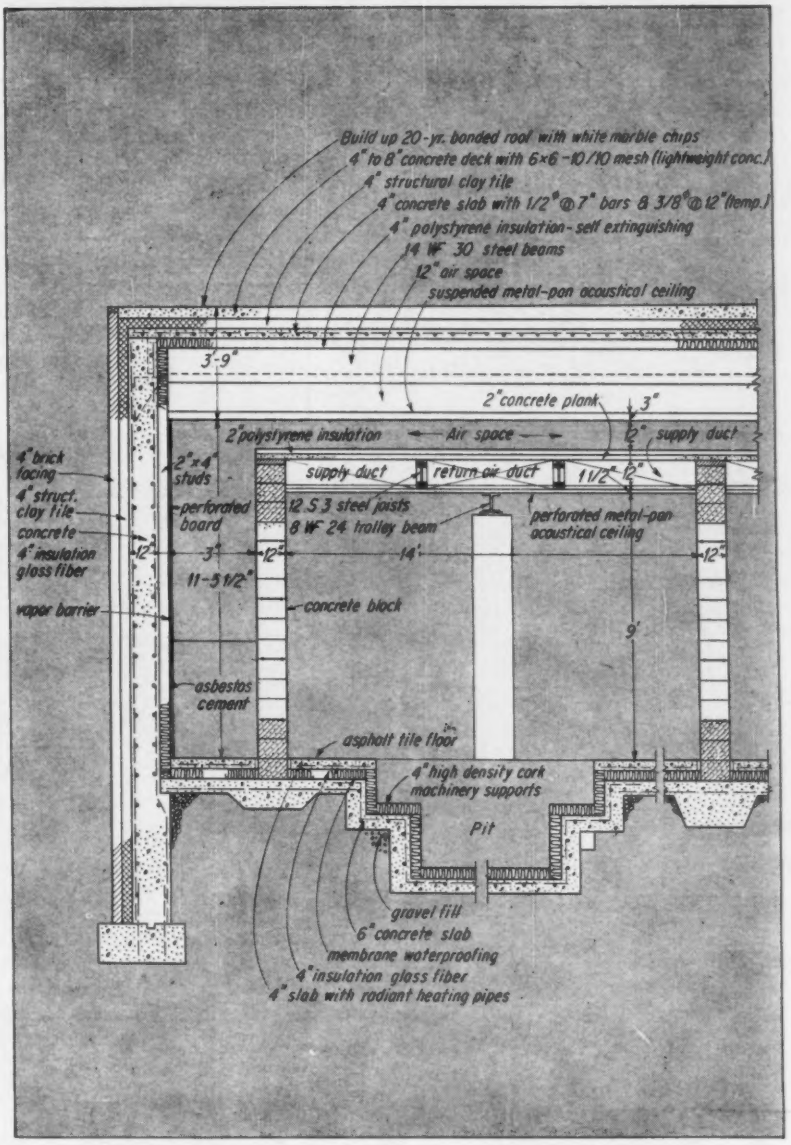
Plant Holds Temperature Within 0.01 F

A building now under construction for Bausch & Lomb, Inc., in Rochester, N. Y., is designed around precision equipment that must be protected against temperature fluctuations and vibrations. It contains rooms in which temperature variation is less than 0.01 F and equipment that will be practically vibration-free.

The structure will be used for production of ruled optical gratings, first produced by B & L about five years ago. These are glass disks 2 in. thick and about 12 in. in diameter used for light-dispersion work, such as in spectroscopy. After one face is coated with aluminum, a diamond cutter rules closely spaced lines in the coat. These grooves, of which there are thousands per inch, are spaced with an accuracy of better than 0.01 microns—thus, the need for temperature and vibration control.

In the existing laboratory in which the gratings have been made, B & L has been successful in maintaining the ruling-engine temperature constant within ±0.01 F for periods exceeding two weeks. The maximum amplitude of vibration of the ruling engines has been kept within 1/40 microns.

But maintenance of these extremely high standards in a structure not designed for the purpose has been difficult. Furthermore, equipment with better automatic control is now available, and there is a need for expanded production and integration of production processes. These considerations led B & L to decide to build a new facility to turn out the gratings.



Building has complex wall and ceiling construction.

• **Vibration control**—The new building will cost $350,000, but the complex, sensitive equipment to be installed will cost $650,000. The one-story structure will be 96 x 108 ft, with provision for a future second story.

The foundations will be set on bedrock, about 11 ft below grade, to protect the machinery from vibration. Only about 6 ft of the building will project above ground. As additional vibration protection, the ruling machines will be placed on spring vibration isolators.

• **Temperature control**—These temperature and humidity tolerances were set up: In noncritical areas—74 F ± 1.5 F, 45% relative humidity. In critical areas—68 F ± 0.01 F, 45% relative humidity maximum.

Since heat from personnel or from other ruling machines affect the precise ruling operations, the equipment will be automatic and installed in separate cells. The walls will consist of an outer 12-in.-thick concrete shell and 4 in. of insulation and an inner 12-in. concrete shell separated by passageways or narrow laboratories. The inner wall houses an area divided into four cells, for four machines. The equipment is expected to run for as long as six weeks without anyone entering the cell.

Improved insulation will cut construction costs compared with the existing laboratory, which is topped with 8 ft of earth for insulation, requiring heavy structural reinforcing. The ceiling is built from the inside up as follows: perforated metal pans, 12-in. air space containing structural steel framing, 2-in. concrete plank, 2-in. polystyrene slab and 12-in. air space. Above this construction is a 2-ft 5-in. air space for ductwork and steel roof framing, 4-in. polystyrene slab, 4-in. concrete slab, 4-in. clay tile, 4-in. lightweight concrete and builtup roofing.

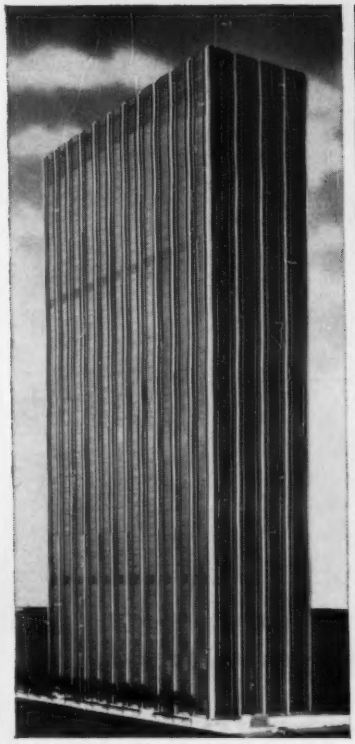
The building was designed by Carl R. Traver, architect, of Rochester, and Eggly-Furlow, engineers, of Philadelphia. John B. Pike & Son, Rochester, was the general contractor.

Steel Pipe . . . the versatile "common carrier" for the nation's hidden "transportation" needs

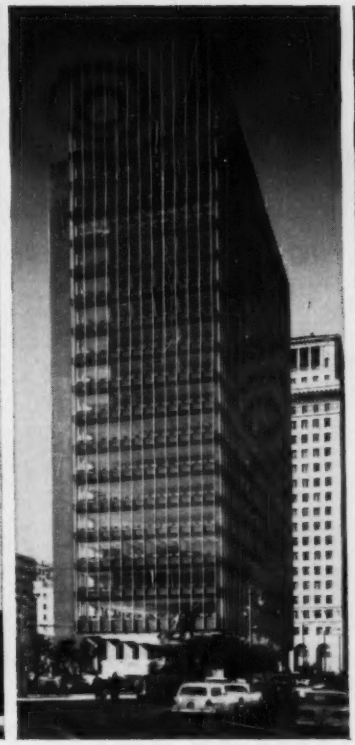
Behind the towering facades of the nation's ever growing skylines, *steel pipe* efficiently and economically meets the needs for dependable heat, waste, water and vent lines. And when the lights flick on, telephones ring, elevators move, their power is conveyed and protected in rigid *steel conduit*. In fact, the reliable performance of *steel pipe* for a wide variety of uses makes it acceptable without question in the nation's commercial, industrial and residential structures.

Versatile *steel pipe* has inherent strength and rigidity. It is easy to join and form into the most intricate shapes. *Steel pipe* is economical . . . no other metal tubular product provides the ready availability, low initial cost and low installed cost.

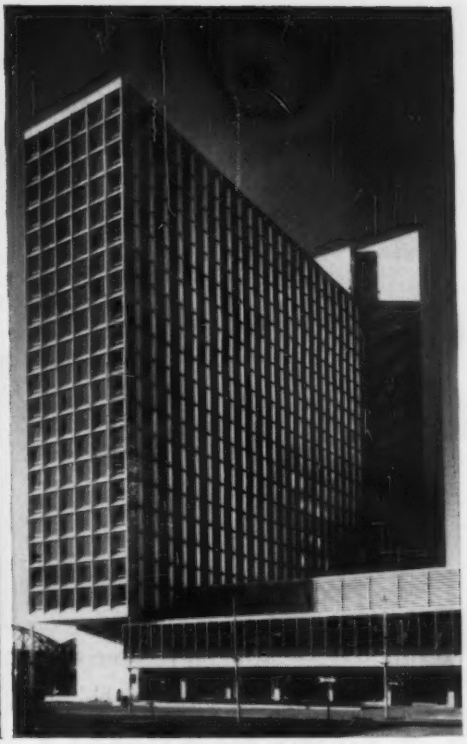
These are some of the reasons why *steel pipe* is widely used for vent and drainage lines, heating and cooling, snow and ice melting, refrigeration and ice making, fire protection systems, electrical conduit, structural uses and water, steam and gas lines.



In New York—**Steel pipe** serves Rockefeller Center's Time & Life Building. Architects: Harrison & Abramovitz & Harris. Contractors: George A. Fuller Co. and John Lowry, Inc.



In San Francisco—**Steel pipe** serves the Crown Zellerbach Building and its sunken plaza. Hertzka & Knowles and Skidmore, Owings & Merrill, Associated Architects. General Contractor: Haas & Haynie.



In Pittsburgh—**Steel pipe** serves the Pittsburgh Hilton Hotel, showplace of the City's Golden Triangle Renaissance. Architect: William B. Tabler. Contractor: Turner Construction Co.

Vent and Drainage: Galvanized *Steel Pipe* is quickly, easily installed on the job. Joints are sturdy, dependable, need minimum horizontal bracing which permits economical installation, even in long runs.

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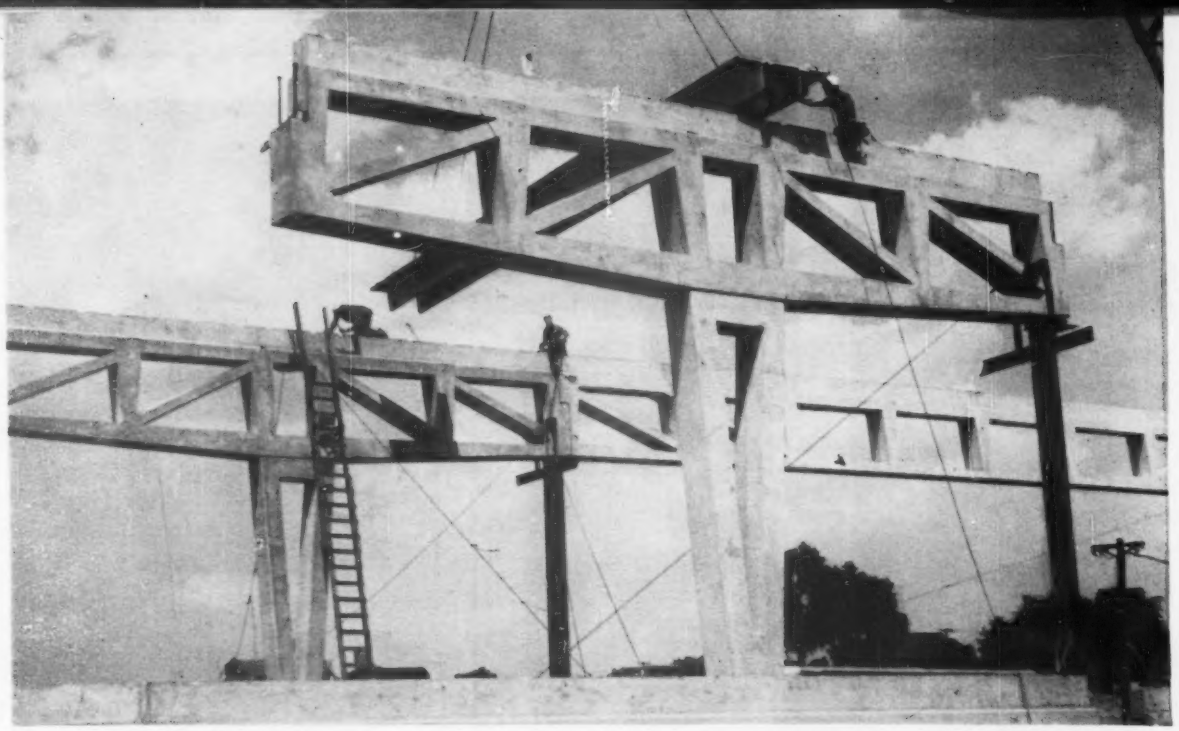


Precast trusses, with cantilever sections supported on V-shaped columns, span up to 120 ft.

Prestressed Concrete Trusses Save

Structural redesign of a large refrigerating plant to cut construction time may mark an important step toward establishing the economy of long-span prestressed concrete.

Substitution of prestressed concrete for steel produced an estimated two-month time saving. And an estimated cost saving of 1% also appeared as a bonus to the owner, Merchants Refrigerating Co. of Secaucus, N. J.

Abbott Merkt & Co., Engineers, of New York City, first designed a system of 110-ft simple-span steel trusses. A late estimated delivery date, however, prompted them to investigate prestressed concrete as an alternate. Atlantic Prestress Co. of Trenton, N. J., proposed a framing system featuring continuous, prestressed concrete trusses designed by A. E. Komendant, consulting engineer of New York City. And the precasters promised to complete erection two months earlier than the completion date estimated for the steel framing.

Cost estimates for the prestressed concrete framing, with prestressed double tees spanning the 45-ft bays, worked out to $3.01 per sq ft for the 440 x 360-ft freezer room. This figure included a $0.04-per-sq-ft allowance for additional foundation cost resulting from increased dead load. Simultaneous estimate for the structural steel roof framing, with long-span joists and ribbed metal roof deck, came to $2.66 per sq ft. This figure included an estimate for framing a mezzanine floor and a machine room, which were already included in the prestressed concrete estimate.

An estimate of $0.38 per sq ft for field painting and fireproofing the steel columns boosted the total estimate for the steel framing to $3.04 per sq ft, slightly higher than the prestressed concrete estimate.

These estimates were made about one year ago. They might be somewhat different today.

Column spacing was changed slightly for the prestressed truss design to redistribute the bending moments. Exterior spans are 100 ft; interior spans are 120 ft. Each continuous line of trusses across the 440-ft freezer room has four "drop-in" spans of 80-ft length supported on double-cantilever trusses extending 20 ft from each of the three interior columns. Top chord of the central cantilever truss was raised to accommodate air-handling ducts.

Top chords of the trusses are inverted tee sections, 27½ in. deep. The flanges are 24 in. wide, providing 5-in. bearing for the roof members. Bottom chords are roughly rectangular sections, 24 in. wide and about 12 in. deep.

Spanning the 45-ft bays along the 360-ft dimension are precast, pretensioned double tees, which also brace the trusses laterally. Single exterior bays of 35 ft or 50 ft, surrounding the cold storage area on three sides, are also decked with double tees.

Mr. Komendant designed each drop-in truss as a self-anchored suspension system. In the bottom chord are seven cables: two extend full length, three bend up into the end diagonal, and two others bend up into the second diagonal. The five draped cables provide suspension action and resist shearing forces in the truss panels. Vertical web members support the top chord like a continuous bent on elastic supports.

The V-shaped columns will reduce the secondary stresses caused by a temperature differential of 100 F, the difference between summer erection temperatures and a future operating temperature of −10 F in the freezer room. The double-bearing seat for the cantilevered trusses increases the flexibility of the continuous spans by permitting transfer of bearing stress from one seat to another as the thermal stresses expand or contract the frame.

Other techniques of reducing temperature stresses include:

- Pendulum support at the exterior columns.
- Semi-rigid truss-to-truss and truss-to-column connections, made by post-tensioned steel dowels.
- Erection of each continuous truss in a line that zigzags in plan.

The zigzag erection pattern relieves axial stress induced by temperature changes by merely allowing the truss line to straighten as the connected segments contract under temperature drop.

Drop-in span, 80-ft long, was set by truck cranes between 20-ft cantilevers.

Time and Money for Big Plant

Mr. Komendant analyzed the secondary moments and shears by elastic theory under short-term load and by plastic theory under long-term load. Heavy longitudinal bars, wrapped with closed ties, resist these stresses in all truss members.

Exterior columns at opposite ends of the 440-ft cold-storage room leaned outward nearly 1¼-in. out of plumb after erection. Periodic field measurements show these columns approaching plumbness under a temperature reduction of about 80 F from summer erection temperatures.

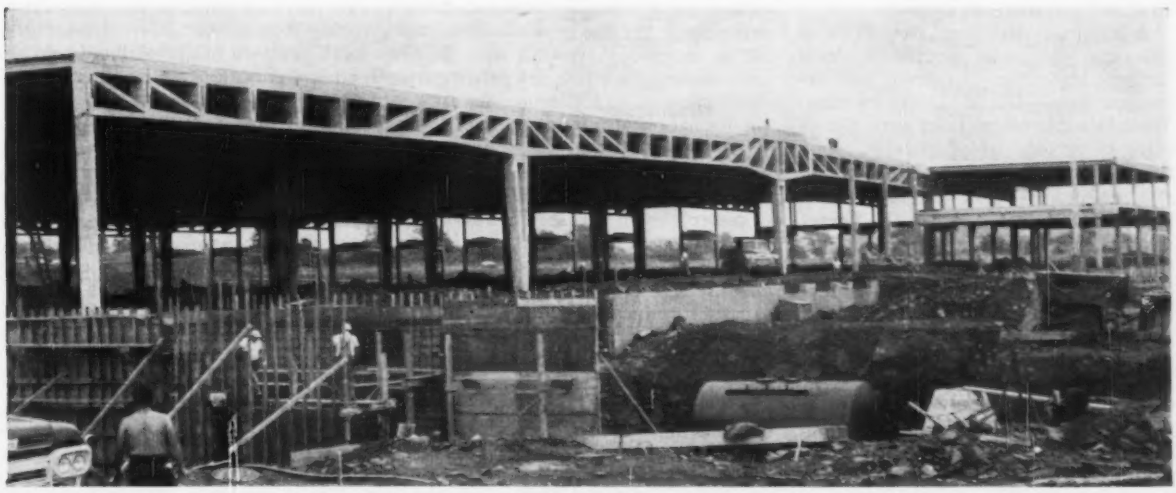
The interior truss sections are designed as cantilevered rigid frames. In the top chord of each cantilevered truss are eight tendons: two extend full length; three bend into the exterior-panel diagonals; three bend into the interior panel diagonals. All six draped tendons anchor at the bottom chord.

Originally, the fabricators planned to ship all the truss sections to the site in the 40-ft lengths in which they were precast. But when it became apparent that they could complete the post-tensioning operation more efficiently at the plant, they decided to ship the drop-in trusses in their full 80-ft lengths. Cantilever sections were only 40 ft long.

Workers removed the steel forms the following morning after the 6,000-psi mix had been cast. Interior sections of the forms were pulled out by hydraulic jacks.

Post-tensioning of the drop-in spans followed three or four days after concreting, when the steam-cured concrete had attained strengths of 4,500 to 5,000 psi. Before post-tensioning, Atlantic had to align the two 40-ft halves of each 80-ft truss on a foundation bed.

(*Turn the page*)



Nine lines of continuous trusses frame long dimension of 440x360-ft cold storage room.

Grouting and welding the connection plates of each midspan construction joint usually required one day.

Friction and anchorage losses were overcome by temporary over-stressing of the tendons, held for a short time and then reduced to the required force. Adjustments in the normal wedge-plug pressure also helped balance anchorage losses. Maximum friction loss of 22% occurred in draped tendons in the drop-in span. Maximum loss in the conical wedge anchorages was measured up to 40% in trial jacking of the shortest tendons in the cantilever trusses.

Tendons were 0.276-in.-dia cables made up of 12 wires each; ultimate strength was 250,000 psi.

Atlantic's plant workers pumped a special grout into the flexible metal conduit housing the prestressing tendons. Because of the extremely cold temperatures of the freezer room it was necessary to exclude any possible free water that might remain in the grout, for it might freeze and, on expanding, break the concrete outside the conduit. The engineer specified a grout composed of cement, fly ash and intrusion aid and water—a mix proportioned to hydrate all free water in the mix.

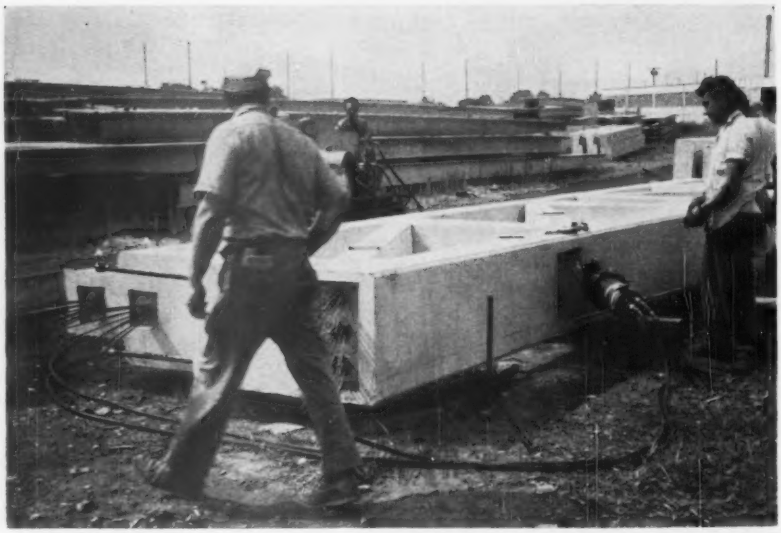
Scott Bros. of Trenton, N. J., hauled the 40-ton drop-in trusses in vertical position and the 40-ft cantilever trusses in horizontal position for shipping convenience. Heavy structural steel frames laterally supported the drop-ins in transit (see photo).

Scott's drivers generally made the 60-mile trip from the Atlantic plant in Trenton to the Secaucus site in 24 hours, travelling in pairs and stopping overnight.

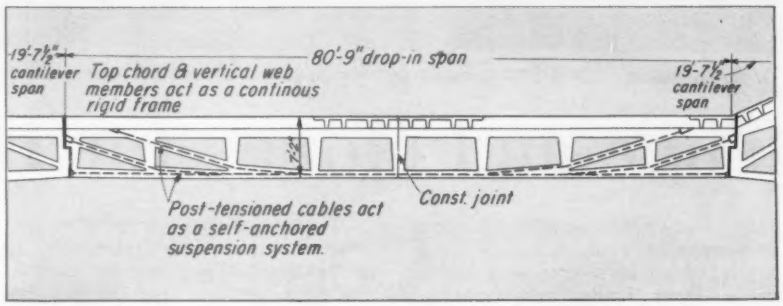
At the site Cornell & Co., Inc, of Woodbury, N. J., first erected the columns and cantilever sections and then lowered the drop-ins into place. Two crawler cranes, one at each end of the drop-in, lowered each section over the dowels projecting from the cantilever seats.

A temporary structural steel shore at one end of each double-cantilever section kept the cantilever sections levelled and balanced during erection. Several double tee sections were also in place to provide lateral stability along the long axis of the building.

A roof drainage plan designed to keep rain water conductors out of the freezer area led to an unusual design in the prestressed double tees. Abbott Merkt Engineers pitched the roof toward adjoining corridor bays. To minimize local deflections that might result in standing water on the roof, Mr. Komendant designed a 16½-in. double tees, with lightweight concrete in the 2-in.-thick flange and upper rib. Normal stone concrete makes up the lower 10 in. of each rib. Strength of the lightweight concrete was 2,500 psi, compared with 7,000 psi for the stone concrete. Ratio of the lightweight concrete modulus of elasticity to that of the stone concrete was 0.3.



CANTILEVER TRUSSES were post-tensioned in horizontal position, with jacks working at both ends of tendons to minimize friction losses.


19'-7½" cantilever span
Top chord & vertical web members act as a continous rigid frame
80'-9" drop-in span
19'-7½" cantilever span
Post-tensioned cables act as a self-anchored suspension system.
Const. joint

DROP-IN TRUSS acts as self-anchored suspension system. Interior panels are like a continuous bent. Draped tendons resist panel shearing forces.

Because of the higher strain and greater rate of plastic flow in the topping concrete, the prestress was transferred into the stiffer concrete in the ribs. This limited the upward initial deflection. Yet the whole section will act in resisting downward load deflection, thus minimizing irregularities in the roof plane and safeguarding against the formation of waterpools.

The engineers took elaborate precautions in designing the insulation for the freezer room, which will be used chiefly to preserve retail packaged frozen foods. The roof has 5 in. of insulation in two layers—a 3-in. thickness of closed-cell polyurethane block topped by 2 in. of expanded cellular glass block.

Roofing consists of hot asphalt with glass reinforced felts and a smooth cap sheet coated with white crushed granules. Extra cost of this highly-reflective coating will be more than offset by savings in refrigeration costs.

Floors have a 6-in. layer of expanded polystyrene sandwiched between a 5-in. base slab and a 6-in. top slab. Heating pipes in the base slab keep the ground from freezing. The top slab is reinforced to resist 11-kip wheel loads and a 900-psf storage load.

An 8-in. thickness of expanded molten glass insulating material, braced by a system of steel studs and girts, forms the partition around the cold-storage room. A tensioned layer of heavy wire mesh, fastened to the steel and held several inches in front of the partition, will protect it from damage by fork-lift trucks.

Even the column bases were insulated to preserve the integrity of the insulating system. The steel column base plate of each column sits on an 8-in.-thick oak grillage plate reinforced with bolted steel plates on each side. Height of the columns was set with levelling screws between the foundation tops and the bottom of the base plates, which were then grouted.

Turner Construction Co. was the general contractor. V. C. Patterson Associates of York, Pa., designed the refrigerations plant. Abbott Merkt & Co. designed the building, as well as mechanical and electrical work.

A Complete Sewage Disposal Program for Builders and Developers

Mr. Jay Stream (Above)
Durable Construction Co.
Wheaton, Illinois

Engineer:
Mr. Harold Steinbrecker
Wheaton, Illinois

...from "thinking" stage into operation

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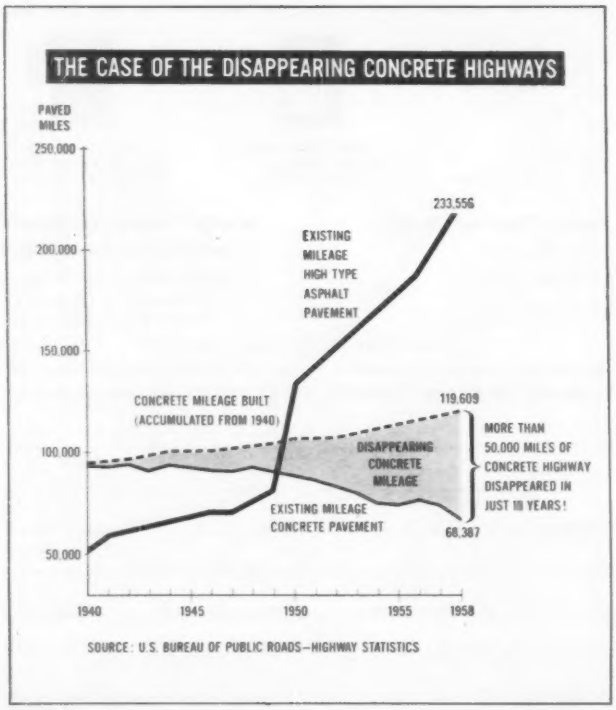
E-6034

ASPHALT presents the case of—

The Disappearing



Thousands of miles of expensive concrete roads have disappeared from view in the last 18 years. Most of these roads have had to be covered over with Asphalt paving to restore a satisfactory level of riding safety and comfort. How much better it would have been to use total Asphalt construction in the first place! Many millions in tax dollars would have been saved due to the more economical construction and lower maintenance costs of Deep Strength Asphalt pavements.

Concrete surfaced highways are actually disappearing from the records of the U.S. Bureau of Public Roads faster than they're being built. As this graph shows, from 1940 to 1958, despite the fact that more than 30,000 new miles of concrete roads were con-

EXPLANATION: Figures represent total mileages of high type Asphalt and concrete pavements built by State Highway Departments on state primary systems; municipal extensions to state primary systems and secondary and local roads built by State Highway Departments. See U.S. Bureau of Public Roads HIGHWAY STATISTICS—SUMMARY TO 1955 —table SMB-201 and tables SMB-2, 1956 to 1958 inclusive.

CONCRETE Highways!

structed, *total* concrete mileage *decreased* by over 50,000 miles. This is a decline in concrete mileage 9,000 miles greater than the entire new Interstate Highway System now being built.

During the same period, according to the Bureau of Public Roads records, high type Asphalt-paved mileage increased over 180 thousand miles. And today, over 90% of America's paved roads are Asphalt-surfaced.

One of the reasons for this is that each year the nation's petroleum industry invests over 4 million dollars in engineering research to keep Asphalt pavement the safest, most durable, economical pavement available.

NEW BOOKLET

Deep Strength Asphalt pavement can mean more miles of better roads for your tax dollar. To get the facts, read the new booklet, THE BETTER WAY TO BETTER ROADS. For your free copy, write The Asphalt Institute.

THIS IS AN EXAMPLE OF DEEP STRENGTH ASPHALT CONSTRUCTION

Its laminated, multi-layer, heavy-duty construction will outlast all other types of pavement, even those claiming to last 50 years or more.

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A. 1½" Asphalt Surface Course. **B.** 2½" Asphalt Binder Course. **C.** 4" Asphalt Base Course. **D.** 6" Subbase Course with Asphalt Prime Coat. **E.** Subgrade Soil or Improved Subgrade.

The **ASPHALT INSTITUTE**

College Park, Maryland

Terrain and weather pose unusual problems for highway engineers, builders and travelers in

No. 1 Alaskan Road Problem:

Designers of Alaskan highways probably don't have any more problems than are encountered on such projects in the other states, but the problems are unquestionably different.

Take, for example, the 62-mile Eureka-Tanana highway being designed by Meissner Engineers, Inc., of Chicago. The $3-million project will be an extension of the present secondary road, which joins the Alaska (originally called Alcan) Highway at Fairbanks (see map). Eventually it will be an important segment in a proposed east-west highway linking Fairbanks and Nome. At present its chief objective is to open a sparsely populated, undeveloped area.

When the consulting engineers were given their design contract by the Alaska Department of Highways in August 1959, they knew one of their big problems would be an adverse soil-permafrost condition. Other anticipated problems included muskeg; potential landslides; drainage, seepage and icing; temperature range from −70 to +100 deg F; difficult access to the site; and saturated, fine grained soils that seldom dry out.

The absence of suitable borrow material is also a major problem, according to T. D. Sherard, State Director of Highways and Chief Engineer. There are practically no natural deposits in that area that are not susceptible to frost. Suitable granular material must be hauled a great distance, or produced by crushing and screening residual materials on the job.

Perhaps the toughest problem to lick, for both designer and contractor, is permafrost. About five miles of the 62-mile highway will be built over permanently frozen soil.

The permafrost varies in thickness from a few feet in central and southern Alaska to over 900 ft in northern Alaska. During the summer the upper few feet thaw. The section that freezes and thaws seasonally is commonly called the "active zone."

Presence of the active zone and the likelihood of thawing deeper permanently frozen subsoils during construction creates a difficult problem for engineers. Permanently frozen soils often contain great quantities of ice—either as wedges, massive layers, thin ice sills, or minute ice crystals. Any disturbance of the surface that results in thawing makes the area unsuited for most structures—particularly if the soils are fine grained.

Some permafrost materials, however, are frozen sand, gravel or rock. They can be excavated and used to make roads about the same as similar nonfrozen materials. Excavation is more difficult, however, and there will be considerable shrinkage when these materials contain large amounts of ice.

Blasting is not very effective in excavating permafrost materials such as frozen muskeg or supersaturated silts. In most instances the frozen material will give with the shock instead of breaking. One method is to strip off the cover and remove the material daily as it is melted by the sun. Ripping to speed the thawing action is practical in some materials.

As the Army Engineers discovered when they built the Alcan Highway (ENR Jan. 14, 1943, p. 63), the best thing to do in permafrost areas is to prevent thaw. Where the highway traverses these areas the insulating cover of vegetation is not disturbed and a "blanket" of "shot rock" or quarry run material is placed.

In these sections the blanket material will be end-dumped from trucks operating in reverse. Specifications will call for this "special fill" to contain 2-ft maximum size stone and a maximum of 10% "fines." This protective blanket will generally be 5 to 6 ft thick; in some locations 8 to 10 ft may be required.

These embankments will also be protected on both sides by 10-ft-wide berms placed to a height of 2 ft above ground line. The berms tend to reduce thaw under the embankment and intercept surface runoff thereby helping to keep detrimental heaving and erosion due to thaw away from the embankment proper.

They also give maintenance crews a chance to locate potential thaw damage zones and take corrective action.

A loessal mantle covers much of the high ground. Underlain by an impervious stratum of rock or permafrost and covered with a deep moss which retards runoff and evaporation, the silt is saturated and subject to severe frost heave.

This condition also promotes lateral movement of the soil even on relatively gentle slopes. In these areas 2- to 3-ft-thick blankets of special fill will be placed beneath the roadway and removal of unstable soils on the upper cut slopes will be necessary.

As a final precaution, to avoid damage by thaw from surface runoff, the designers call for highline interceptor ditches in upper-slope areas leading to transverse drainage structures.

In determining the most feasible route, engineers used aerial photos made by Fairchild Aerial Surveys, Inc. They were made at a scale of 1 in. equals 2,000 ft. Ground controls were established and topographic maps were made at a scale of 1 in. equals 400 ft with a 10-ft contour interval. Also available were U.S.G.S. topographic maps of the area and aerial photos at a scale of 1 in. equals 4,000 ft.

The designers supplemented these data with several reconnaissance flights, inspection of locations on the ground

the Far North.

Permafrost

and by digging test holes. A soils and materials survey was made by photographic interpretation of the aerial photographs. The information was transferred to the location maps.

As a result of the preliminary planning and location studies Meissner Engineers prepared cost estimates on several alternate routes. The shortest feasible route between Eureka and Tanana would be 58 miles long, but would include 13 miles through permafrost. The recommended route is four miles longer but has only five miles of construction through permafrost areas.

The centerline profile of the highway ranges in elevation from 200 ft above mean sea level at the Yukon River, to about 2,000 ft.

Horizontal and vertical alignment of the highway meet minimum standards for two-lane Class "A" Secondary Highways, as established by the Bureau of Public Roads.

The route is classified as "rolling topography," and maximum design speed is 50 mph. Although it is expected to cost only $50,000 per mile, it is being designed for reasonably good alignment and grade, and with a good subbase. These characteristics will be upgraded, as necessary, in the future.

Horizontal curvature is limited to 9 deg, with 7% maximum grades. To provide as much mileage of highway as possible for the available money, the grade line can be rolled to fit the topography.

The completed highway will utilize the top of the subbase as a riding surface. This 24 ft wide graded gravel subbase will range in thickness from 12 in. to 24 in. In future years the roadway will be surfaced with bituminous pavement. Side slopes for cuts and fills up to 5 ft will be 1 on 3. Above 5 ft they will be 1 on 1.5.

Just before reaching Tanana, the highway must cross the Yukon River, which is about 3,500 ft wide at that point.

As part of their contract, Meissner Engineers are making a comprehensive study of this crossing, both as to location and type of structure.

The study includes a possible ferry crossing, since the low volume of anticipated traffic during the next few years may not justify the construction of a bridge now.

If and when a bridge is designed one of the big problems will be ice pressure on the substructure during the spring break-up. This occurs usually near the end of May. In past years, some residents have observed blocks of ice up to 9 ft thick and 150 ft long floating down the river.

With the exception of the proposed Yukon River bridge, only eight small bridges are needed in the 62-mile highway. They vary from 20 ft to 80 ft in length.

Designers probably will choose treated timber or rolled steel beams with laminated treated timber decks. They are designed for H20 loading, with a 24-ft clear roadway between the curbs.

Most pile-supported bridge troubles in Alaska are due to the active frost zone. When the surface freezes it seizes the pile at ground level and, as the frost penetrates, the hold on the pile is strengthened. Expansion inherent in freezing tends to lift the pile. Bridges warp out of shape, since the amount of lift is not uniform from pile to pile.

Smaller drainage structures probably will be corrugated metal pipe of 18-in. to 60-in. in diameter.

The State's Division of Highways operates under the Department of Public Works, R. A. Downing commissioner. Mr. Sherard's two assistants are A. G. Gardner (Operations) and Donald R. Roser (Administration).

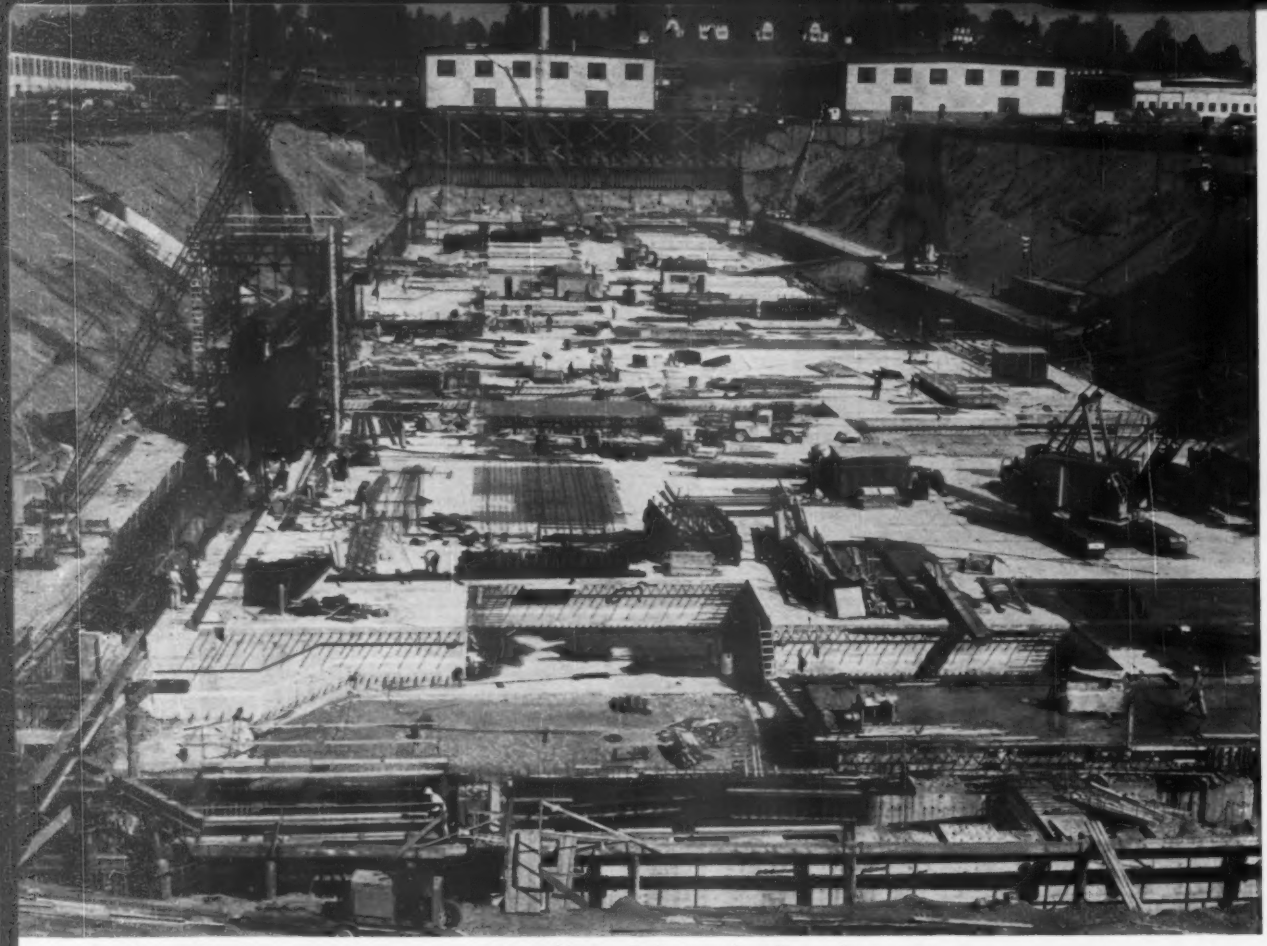
For Meissner Engineers, Donald A. Walsh is chief civil engineer and Roy Hauge is project engineer. Others in charge include Frank Dalton (Bridges), C. W. Tarman (Highways), and L. T. Hooper (Soils).

Contracts for constructing the first section of the Eureka-Tanana highway are scheduled to be awarded in 1961.

Route Name	From-To	Mileage	Surface
Alaska (P)	Yukon Territory Boundary to Fairbanks	297	Bituminous
Haines Cutoff (P)	Haines to British Columbia Boundary	42	Bituminous
Richardson (P)	Valdez to Big Delta	268	Bituminous
Glenn (P)	Anchorage to Glenallen Jct.	186	Bituminous
Glenn (P)	Gulkana Jct. to Tok Jct.	125	Bituminous
Taylor (S)	Tetlin Jct. to Eagle	161	Gravel
Denali (P)	Paxson Lodge to North Boundary, McKinley Park	254	Gravel
Seward (P)	Seward to Anchorage	128	Bituminous
Sterling (P)	Homer to Soldotna	88	Gravel
	Soldotna to Jct. with Seward Hwy.	70	Bituminous
Edgerton (S)	Chitina to Jct. with Richardson Hwy.	39	Gravel
Steese (S)	Fox (Fairbanks) to Circle	153	Gravel
Elliott (S)	Fox (Fairbanks) to Eureka (Manley Hot Springs)	106	Gravel
Nenana (P)	Fairbanks to Nenana	58	Gravel
Planned (S)	Eureka to Tanana	62	Gravel

(P) Primary (S) Secondary

NEW STATE has only the skeleton of an adequate highway system connecting widely scattered commercial and recreational centers.



Inside cofferdam, workers concrete walls and floor of relieved structure.

World's Largest Drydock Takes

Contractor casts 7-ft-thick floor in checkerboard pattern.

An extensive two-stage dewatering system and high-speed concreting mark construction of the world's largest drydock at the Puget Sound Naval Shipyard, Bremerton, Wash.

Inside dimensions of the drydock will be 1,152 x 180 ft, with 42 ft of water at mean lower low level (ENR Jan. 29, 1959, p. 38).

Work on the drydock is in three stages:

- Dredging unsuitable material, backfilling with select material, cofferdam construction and dewatering.
- Concreting of floor and walls.
- Installation of mechanical equipment, including a gigantic floating caisson gate (ENR Aug. 4, 1960, p. 33).

Manson-Jones-Perini-Osberg, joint venture contractors, began work on the project early in 1959. Completion is scheduled for March, 1962.

First major step for the contractor was to remove some 600,000 cu yd of mud and silt from the site. The top of the unsuitable material was about 42 ft below MLLW. A 16-in. suction dredge equipped with a 7,000-ft dis-

Water jet sluices material to backfill cofferdam.

Part of fill was compacted by Vibroflotation.

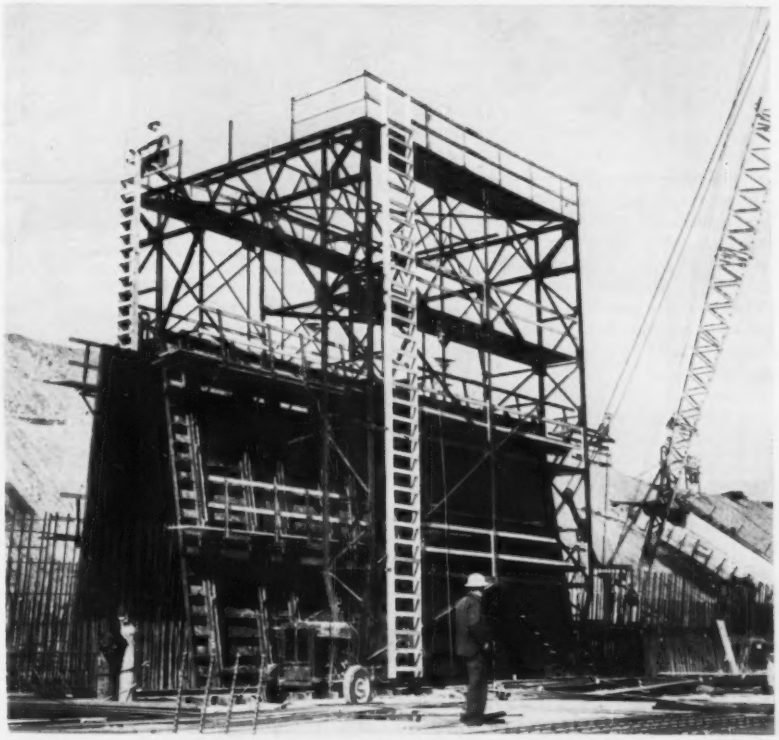
Shape

charge line removed about half the material, remainder was removed by three barge-mounted derricks fitted with 3-cu-yd clamshell buckets.

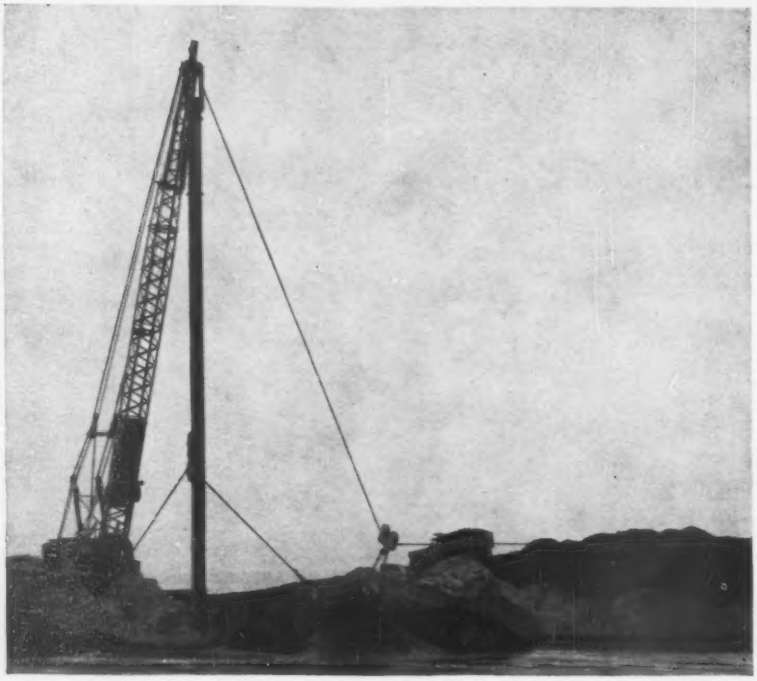
Placement of select fill on the bottom closely followed dredging. The contractor used flat deck barges to bring the fill material to the site from a pit three miles away. Barge-mounted monitors sluiced the material into the water. Backfill was built up along both sides of the drydock area until it was about 40 ft below MLLW; the central portion was left at about the elevation of the drydock base.

The contractor then drove a row of 40.5-lb-per-ft "Z" sheet piles along each side of the drydock area to form part of a cofferdam. The pile rows are located about 150 ft outside the drydock; they will remain in place as part of the permanent construction. The outboard end of the cofferdam consists of eleven 60-ft-dia circular sheetpile shells using flat sheets.

The contractor then placed some 600,000 cu yd of backfill to complete the cofferdam walls. Crest of each



Gantry and steel forms are used to cast drydock walls.



Shoreline Reclamation by Crescent Scraper

Several million yards of sand and gravel are being used to extend the plant area of a Canadian steel company. Bottom-dump barges are used for the initial 20 ft. of fill. The additional 10 ft. below water and up to 15 ft. above lake level is built by redistributing the barge piles along the existing shore line.

The material is redistributed by a crane using a 5-yd. Crescent Scraper Bucket and carrier. On operating spans of up to 350 ft., the crane's hoisting line is used as a track cable. It is reeved through a block at the boom tip to a tail barge anchored offshore.

The barge swings on 200 ft. of anchor cable which permits a long period of crane operation before the anchor is shifted to a new location. The crane travels along the shore reclaiming material from a pie-shaped segment with the tail barge anchor as the vertex of the angle. The Crescent Bucket returns by gravity the full 350-ft. span. At average haul distances, it delivers 200 yd. per hr.

A Sauerman Crescent Scraper and carrier with a dragline crane is often the most economical solution to difficult excavating jobs. The normal reach of the dragline is greatly extended by using a track cable with a Crescent and carrier assembly. So equipped, its range is limited only by the spooling capacity of the drums.

Tubular mast supports 80 ft. boom on track cable setup. Tail barge in background. Load line is reeved through a Sauerman Fairlead on mast.

This arrangement has been used quite successfully for contract excavating jobs involving relatively small quantities of material. In many cases where unstable ground is encountered, the crane unit may be located on firm ground and the use of mats eliminated.

Find out how much you can extend the reach of your crane and increase its capacity. Write or call giving the make, model number and boom length of your machine. Field Report 231 and Catalog J. gives more information on Scraper operations with cranes.

SAUERMAN BROS., INC. 632 SO. 28th AVE. BELLWOOD, ILL.
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent Scrapers • Slackline and Tautline Cableways • Durolite Blocks

sidewall is 30 ft wide with the material deposited underwater on a slope of about 2½ to 1.

First stage of the dewatering system went in before the cofferdam was closed. It comprises 66 deep wells spaced around the perimeter of the site, about 35 ft inside the sheetpile walls. Pumping from the deep wells, supplemented by two additional large suction pumps, drew the water down to elevation 65.

In the second stage, American Dewatering Corp.—subcontractor to the joint venture—installed 390 wellpoints on 10-ft centers just outside the drydock area, but inside the deep wells. Pumping through the wellpoints drew the water level down to elevation 51.

Workmen cut the side slopes to 1½ to 1, using draglines, trucks, front end loaders and a conveyor belt.

Specifications required compaction of the top 3 ft 8 in. of the select fill underlying the drydock to 100% maximum density. The contractor used a vibratory compactor and 8-in. lifts over most of the area. At the outboard end, the fill is thicker and Vibroflotation was used to attain the required density.

Since the drydock is designed as a completely relieved structure, there is an extensive system of subdrains.

With subdrains installed and the subgrade compacted, the contractors built a working platform comprising 4 in. of concrete reinforced with wire fabric placed on a polyethylene membrane.

Most of the drydock floor is a 7-ft layer of concrete reinforced top and bottom; thickness increases to 12 ft under the exterior walls. The contractor cast the slab in 24 x 40-ft sections, using 7-ft-high steel forms and a checkerboard pattern. Workmen used manually operated and air-operated buckets to place the specified 3,500-psi concrete. Contractor used portable roofs to protect the slabs in rainy weather.

Side walls are 12 ft thick at the bottom, tapering to 2 ft 9 in. at the top. The contractor is casting these in two stages, using steel forms and gantries traveling on rails. The walls are heavily reinforced and have buttresses of precast concrete columns to support a system of galleries, tunnels and platforms at the top.

Construction of the drydock is administered by the Bureau of Yards and Docks for the U. S. Navy under the direction of Rear Adm. E. J. Peltier, CEC USN. Capt. Charles G. Prahl, CEC USN, District Public Works Officer, Thirteenth Naval District is officer in charge of construction. Resident officer in charge of construction is Capt. John J. Albers, CEC USN, Public Works Officer for the Puget Sound Naval Shipyard.

Walter F. Peterson is project manager for Manson-Jones-Perini-Osberg.

HOT-HOUSE FRAMED BY COLD-BENT BEAMS—The largest and longest structural sections ever cold-bent from mill beams support the roof of the reconstructed Palm House of Chicago's Garfield Park Conservatory.

Johnston Iron Works, Chicago, used 21" WF 62 lb. beams cold-bent by COMMERCIAL to a radius of 50'. The contractor estimated that cold-bending of these 82' wide - 50' high arches saved 60% over conventional fabricating methods.

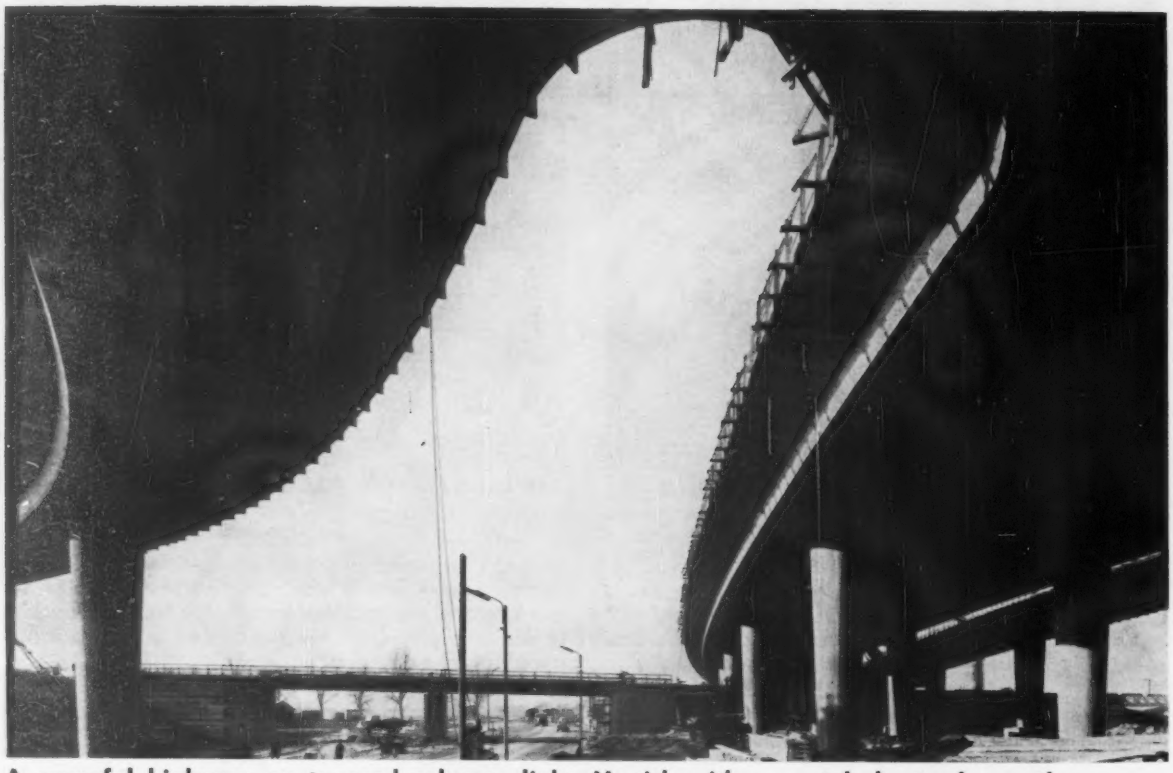
ARCHED CANOPIES FOR LOADING DOCKS—Central Division Headquarters, Northern Illinois Gas Company, Bellwood, Ill. Graham, Anderson, Probst & White, Architects and Engineers, specified 8" WF beams for roof-deck canopy support. Beams were cold-bent by COMMERCIAL and varied in weight from 24 to 40 plf. Accurate forming of beams by progressive bending to a 42' radius made the rise 1' 10" on a 24' span.

New Idea In Arched Roof Supports

ULTRAMODERN SCHOOL DESIGN—10" WF beams @ 31#/ft. and 29#/ft. were cold-bent by COMMERCIAL to varying radii 28 to 35'. These structurals are the load bearing members of the roof framing for the cafeteria and the diving pool of the new Lincoln Park High School, Lincoln Park, Michigan. To span varying widths up to 46' individual members were cold-bent to as many as 3 different radii. Eberle M. Smith Associates, Inc., Detroit, were the architects —Congress Steel Products, the structural contractor.

FOR THE FULL STORY detailing how large, wide-flange beams—progressively cold-bent by COMMERCIAL'S *patented process—saved construction time and money ...write to Commercial Shearing & Stamping Company, Dept. E-5, Youngstown 1, Ohio.*

COMMERCIAL
shearing & stamping



A graceful highway on tapered columns links Munich with an autobahn to the north.

W. Germany Uses Blitz Approach

Bridge on Cologne-Frankfurt route was rebuilt after war.

A traffic explosion threatens West Germany.

Ten years ago the Transport Ministry in Bonn counted fewer than one million registered vehicles. By 1959 their numbers soared to 6.5 million and Germany's thriving economy is putting hundreds of new automobiles on the road every day.

Seven million cars doesn't sound like much compared with the 70 million in the U. S. But West Germany has only 200,000 miles of roads and highways. This gives the country only one mile of road for every 33 cars.

The cars-per-mile ratio in the U. S. is 26, in France 20 and in Switzerland 16. Only Belgium, where 47 motor vehicles are jammed into the average mile of highway, has a greater concentration of cars than West Germany.

Threatened with nation-wide bumper-to-bumper conditions, West Germany has begun the largest, most elaborate highway construction in its history. The plan calls for the expenditure of $15 billion over a 12-year period

Topography forces grade changes like this one near Dortmund.

to Highway Building

for autobahns, federal highways, urban highways and secondary roads.

By the end of the program, in 1971, the Transport Ministry hopes to have completed 1,230 miles of autobahns, 650 miles of federal highways (similar to American state highways), 320 miles of secondary roads, 815 miles of tourist expressways (for scenic areas) and 2,450 miles of highways to by-pass cities and towns. The same program calls for the modernization and rehabilitation of 5,000 miles of autobahns and federal highways.

Five years ago Germany had 1,310 miles of autobahns. The Transport Ministry added another 186 miles to the network by mid-1959 and 265 miles of new expressways are under construction now. By 1967 the autobahn system should have a total length of 2,200 miles.

Autobahn expansion and rehabilitation gets top priority because these highways are best able to cope with long-distance traffic and they will form the core of the European highways system. Of a total of 22 Pan-European highways planned by the European Council of Ministers, nine will be routed through West Germany. These highways will permit speeds of 75 mph and more.

Construction costs are running from $312,000 a mile for autobahns in open, level country, to $3 million a mile for stretches in the industrial Ruhr area, and as high as $8 million a mile for expensive sections of the 60-mile Berlin Expressway system.

The federal government will finance two-thirds of the program from gasoline tax revenues. Local authorities will provide the rest.

The greatest share of the budget for planning and construction of primary roads goes for rehabilitation of the existing network. By the end of the first four years of the 12-year program, German highway builders hope to have extended and widened 2,500 miles of primary roads. Major projects in this work will be:

Widening of a 300-mile section of the 500-mile B3 route between Hamburg near the North Sea and Basel, Switzerland, at a cost of $107 million.

Widening and resurfacing of more than 275 miles of Route 51, between Bremen and Saarbrucken, at a cost of $106 million.

A $100-million rehabilitation of highways in the Black Forest area.

Reconstruction of the 350-mile B-27 route, which runs from the Swiss border near Zurich northeast to join route B-4 near the East German border. This rehabilitation will cost more than $110 million.

Part of the rehabilitation funds has gone for additions of a third, or "crawler," lane to two-lane opposing roadways up and down steep grades.

German autobahns built under Hitler were generally well located, carefully designed and well built, but the road planners of the '30s were misled by the claims of truck manufacturers. The automotive industry said it could build engine units powerful enough to keep even heavy tractor-trailer units moving at high speed anywhere along the nation's highways. As a result, many grades on the old autobahns are too steep and heavy truck traffic has to crawl both up and down.

Postwar designers pay more attention to topography. Opposing roadways now are sited at different elevations when necessary and curves are wider.

The majority of new highways are four lanes wide, but more than half Germany's motorists would like to see six and eight lanes.

German highway engineers are following U. S. leads in designing warning signals into the highway surfaces. A change in the sound of an automobile's tires warns the driver he is too far to the right or left or of an approach to a danger area.

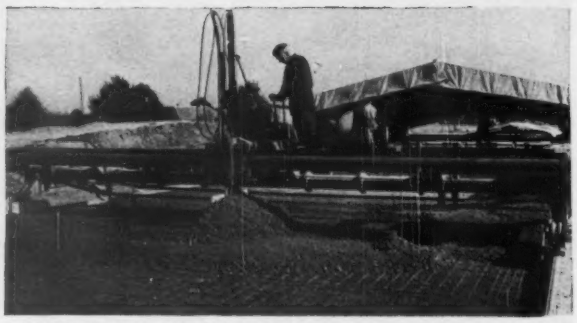
The tremendous increase in highway construction in West Germany has brought with it changes in construction methods.

For example, before World War II 80% of all highways constructed in Germany had surfaces of concrete or other rigid material. But in recent years highway engineers have switched their sympathies to bituminous surfaces. The present ratio in highway surfaces is 70% asphalt and 30% concrete. Some 38,000 tons of asphalt machinery is in use, as compared with 13,000 tons of concrete roadbuilding equipment. Although asphalt has the edge over concrete now, roadbuilders think the ratio will even out in the future.

German highway men are switching from rubber-mounted and crawler type mixers towards semi-portable mixing plants, which offer less weight of equipment. A labor shortage has caused many builders to use slip-form pavers,

(*Story continues p. 54*)

ASPHALT paving train on rails puts down bituminous surface between concrete curbs. Asphalt is used for 70% of highways.



CONCRETE, pre-war highway favorite, is expected to cover 50% of highways in future. Spreader is identical to one at left.

which require about 75% less crew.

Much research work has gone into concrete highway construction to improve the quality of surfaces.

An experimental prestressed concrete pavement near Bingen is 6-in. thick, prestressed 700 psi longitudinally and 210 psi transversely. The slabs rest on a three-course, hot-laid bituminous concrete foundation 6-in. thick. The top course is compacted with sand to give it a smooth surface. The builders eliminated friction on one part of the section by covering the bituminous concrete with two layers of powder-coated paper. In other sections, plastic sheets were used instead of paper. These devices have reduced the friction coefficients on both sections to 0.3, instead of the design specifications of 0.8. A 16-in. anti-frost sub-base was located under the bituminous concrete.

Steel and rubber bellows joints separate the 492-ft slabs. Tests are not completed, but interim measurements and examination show that the surface stands up well.

Israel: New Competitor for Jobs in Africa

Israel's construction industry has become an important arm of the country's foreign policy.

Several construction firms have been at work on projects totaling $110 million in areas stretching from Liberia, in West Africa, to Burma, in Southeast Asia, with a field force that is composed of over 300 well trained Israeli engineers and technicians.

Technion (Israel Institute of Technology), located in Haifa, is organizing courses in English and French for prospective Asian and African students, and the government will provide 1,000 scholarships to Asians and Africans specializing in various technical fields. The Tel-Aviv Efficiency Institute will offer a course for construction foremen from the same areas.

The Institute is also dispatching to Africa a roving team of experts to teach local builders how to operate, store and maintain modern building equipment. At the same time, Israeli companies overseas are training men for their own use.

Among the private Israeli companies working abroad, the Liberian Construction Co. of Monrovia, owned by the Mayer Investment Corp. of Tel-Aviv, plays a leading part. The company has obtained, mostly from the Liberian government, $32 million worth of contracts, including a hotel, a presidential palace, a Public Works Department office, law courts, a university and several schools, office buildings, roads and other public works.

Another pioneer in overseas contracting is Solel Boneh Overseas and Harbours Works, Haifa. In Asia and Africa it operates through branch offices or via joint ventures with local governments. The company is active in Turkey, Burma, Iran, Ghana, Nigeria, Ethiopia and Sierra Leone. The firm employs 240 engineers and technicians working on contracts worth $40 million.

A third company, Water Resources Development of Tel-Aviv, has $40 million worth of contracts in West Africa.

In Ghana, the company is planning the water supply of the five largest cities; in Sudan, it will plan the agricultural settlement of a 75,000-acre area; in Turkey, negotiations are underway for the modernization of the water supplies of Ankara and Istanbul. Investigations have started for planning water systems in Nepal. The company also operates in Ethiopia, the Mali Federation, Liberia, Sierra Leone and East and West Nigeria.

The Engineering Department of Fertilizers and Chemicals Ltd., Haifa, which specializes in planning and erecting chemical plants, has contracted large jobs in Belgium, Greece and Latin America and plans to launch further activities.

Israel has loaned Nigeria $10 million to cover purchases of Israeli building materials. Technion engineers are planning an industrial center in eastern Nigeria and a new Government House in Lagos, the capital city.

Israel has loaned $750,000 to Sierra Leone to buy materials for construction of a Parliment House. The two governments are negotiating on extensive housing schemes.

How does little Israel manage to compete with foreign countries that have more experience and more resources?

First, Israel frequently offers prices far below international standards. After ten years of around-the-clock building in Israel (to house over a million immigrants) work has slowed. Israeli contractors are seeking overseas jobs and they are willing to work at a smaller profit than the minimum acceptable rates of firms from many other countries.

Second, construction activity is part of Israel's economic foreign policy. Through inter-nation commercial agreements, Israel agrees to purchase certain products and the other country, in exchange allocates many public work contracts to Israel. Israel, unlike the big powers, cannot be accused of maintaining strictly political motives. Israel has built up enormous goodwill, through its efforts to educate the natives of the various countries in which it is engaging in construction.

(ADVERTISEMENT)

STEADY PRESSURE for McKiernan-Terry 9B-3 Hammer with Jaeger "600".

MORE AND MORE CONTRACTORS ARE FINDING OUT . . .

AIR COSTS LESS WITH A JAEGER ROTARY

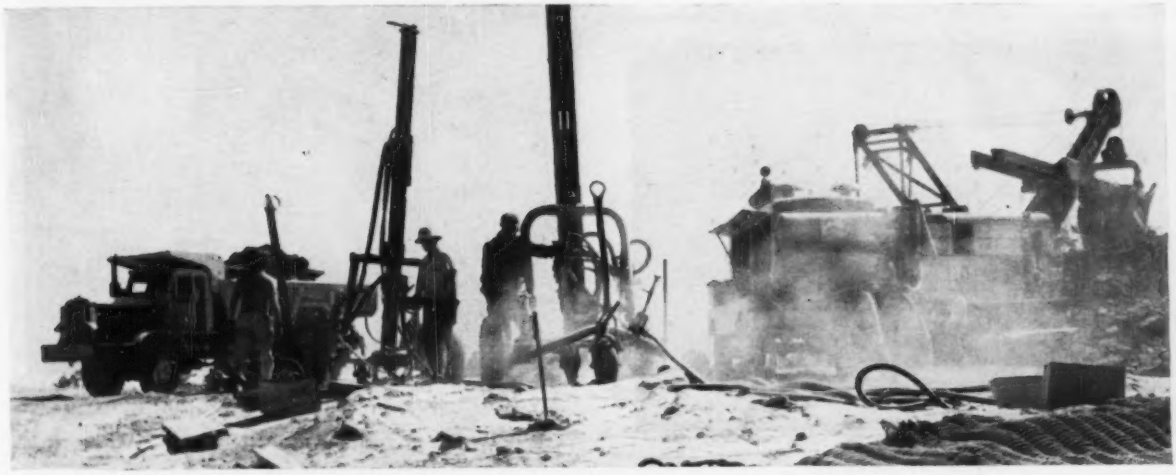
Why do you suppose the men who use Jaeger "600" compressors behind big pile hammers say the Jaeger *"is as smooth as steam"?* Air demand fluctuates violently when you operate a big McKiernan-Terry or Vulcan driver. Jaeger automatic control of engine and compressor is so smooth, so closely regulated, *so instant acting,* that air pressure is held constant under all normal operating conditions. Keeps the tools operating at top efficiency, without over-run, engine racing, wasteful use of fuel.

PAYS OFF ON DRILLING, TOO

The Jaeger "600" also *proves* its greater efficiency by producing full rated capacity at 100 rpm slower speed than others—1700 rpm instead of 1800 rpm — *using the same GM Diesel 6-71 engine.* You save fuel, save engine and compressor wear every hour you work. More than 500 cf of air per pound of fuel, and often as many as 8,000 hours without a vane replacement, are the proof.

Ask your Jaeger distributor for the cost-saving figures on any size Jaeger Rotary — 75 to 900 cfm, or send for new Catalog JC-0.

BELOW: **DRILLING SHOT HOLES AHEAD OF BACKHOE** on 10½ mile trenching job for big Eastern steel company's research center. Two Jaeger "600" compressors supplied low-cost air.



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PUMPS • CONCRETE MIXERS • TRUCK MIXERS • CONCRETE SPREADERS • FINISHERS • FINISHER-FLOATS

"We need the latest, most efficient hauling equipment available . . . we believe that with Haulpak, we have it," says Daniel B. Rengier of J. Robert Bazley, Inc.

"The LeTourneau-Westinghouse 32-ton Haulpak® is the best truck available to handle the hauling of overburden in our strip-mining operations," says Mr. Daniel B. Rengier, Secretary and Purchasing Agent of J. Robert Bazley, Inc., Port Carbon, Pennsylvania, contracting firm. "We need trucks large and rugged enough to handle the big loads of our 8-yd. shovels — yet the trucks have to be fast and maneuverable enough to do it *economically. Haulpaks are the answer!*

Gives us several extra truck-loads per day

"In order to strip overburden efficiently, the eight-yard shovels must be kept in continuous operation, never held up by trucks that are too small or too slow.

"We estimate that the small turning radius of the Haulpak *gains us several truck loads* in the course of a day by shortening turning time on each trip by as little as 30 seconds. Another time saver is the powerful 375-hp engine. It enables Haulpak to come out of the pit in a higher gear and at a faster rate of speed than any unit we are familiar with. Those pit inclines may be as great as eight per cent.

"Fast turn-around, plus high hauling speeds, mean that each truck can gain *one complete round trip in every seven* — of course we are speaking of trips of average length. Ours vary from 800 to 2500 feet.

Hydrair* suspension another money saver

"Further savings result from Haulpak's Hydrair suspension system. By leveling the load, it greatly reduces spillage . . . which also cuts road maintenance. In addition, Hydrair increases the life of the tires by distributing the weight of the load *more evenly* over all six tires. Loads on conventional leaf suspension tend to tip and put the weight on only one side of the truck.

Daily average: 2150 yds per unit

"We estimate that five 32-ton Haulpaks can do the work of seven 22-ton trucks like those we have in our fleet, thereby reducing labor costs as well. According to our records, one Haulpak carries a daily average of 2150 yards of overburden in 14 hours — *thanks to its speed, maneuverability, capacity and power.*

Saw Haulpaks in action

"We chose Haulpak after a trip by three officials of our company, including myself, to an iron ore mine in Utah to see these units in operation," Mr. Rengier continues. "We were impressed with everything we saw, particularly *the low center of gravity, the very small turning radius and the Hydrair suspension system.*

"The truck's driver demonstrated the effectiveness of this suspension system by rapidly turning the steering wheel from left to right while traveling 24 miles per hour. Ordinarily this type of treatment will start the rear of the truck swinging back and forth, but the Haulpak remained completely stable.

"To bid successfully on contracts for strip mining, we need the latest, most efficient equipment available, and we believe that with Haulpak, *we have it!*"

We will give you complete information on LW Haulpak — the first all-new truck in a quarter century. Available in 22, 27, 32, 42 and 60-ton sizes. Ask to see our color film, "Revolution on Wheels". You'll see how and why Haulpak moves more tonnage at big savings.

J. Robert Bazley, Inc., works as many as 200 trucks on its road-building and strip-mine operations, and employs up to 800 men. Its president and founder, J. Robert Bazley, has served as American Consultant to the National Coal Board of Great Britain, to design most of Britain's present day open pit mines. Mr. Bazley's grandfather, Nathan Cuyle, designed and patented one of the first power shovels used in open pit mining. The Haulpaks illustrated here are in use at the Pine Forest stripping operation owned by the Reading Anthracite Company and located near St. Clair, Pennsylvania. J. Robert Bazley, Inc., has run the stripping of this coal mine for about 30 years. This is one of three strip mines it works under contract.

*Trademark HP-2308-DCMJ-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

portrait of an airport...

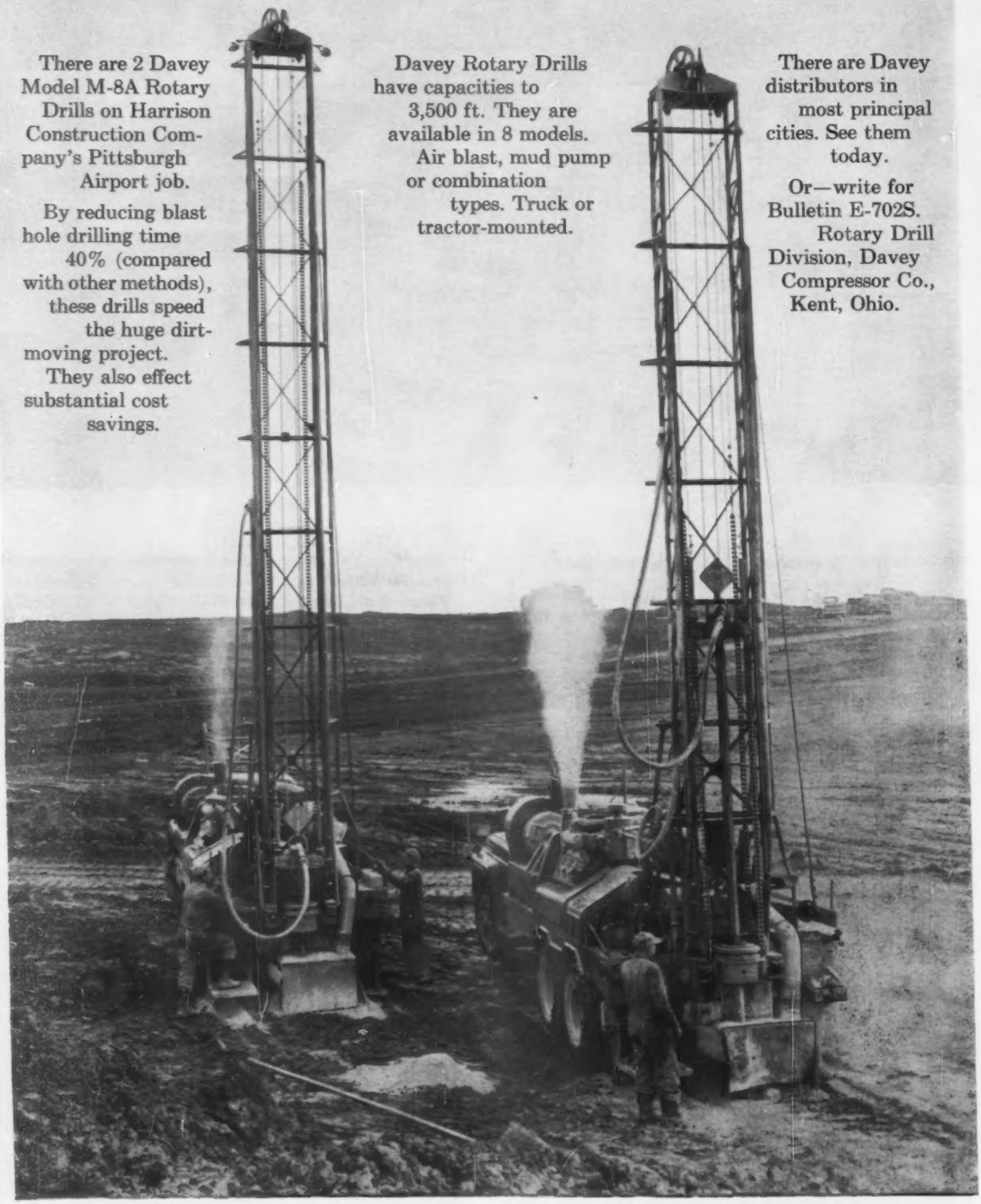
There are 2 Davey Model M-8A Rotary Drills on Harrison Construction Company's Pittsburgh Airport job.

By reducing blast hole drilling time 40% (compared with other methods), these drills speed the huge dirt-moving project. They also effect substantial cost savings.

Davey Rotary Drills have capacities to 3,500 ft. They are available in 8 models. Air blast, mud pump or combination types. Truck or tractor-mounted.

There are Davey distributors in most principal cities. See them today.

Or—write for Bulletin E-702S. Rotary Drill Division, Davey Compressor Co., Kent, Ohio.



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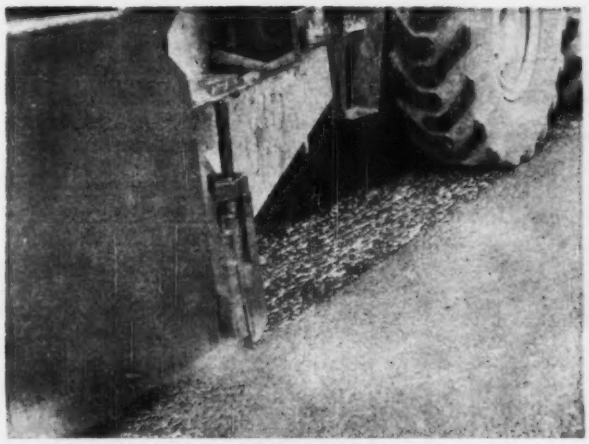
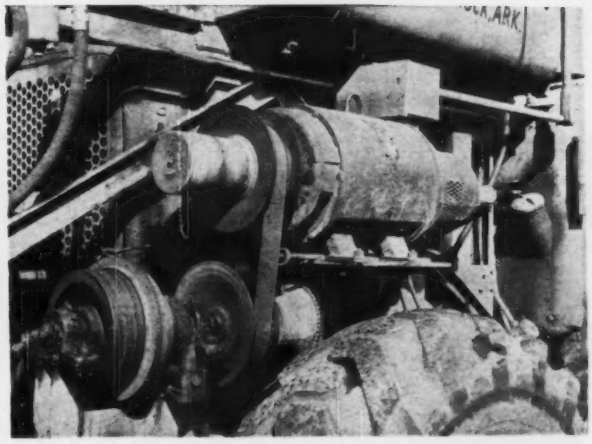
Rotary Drills — Portable, "Auto-Air", Tank-Mounted and Stationary Compressors
Air Tools — Mobile Machine Shops

A-2089A

Modified motor grader heats and planes old pavement prior to resurfacing.



Steel blades shear surface behind furnace.



Novel set-up feeds steady input to generator.

Faster Planing for Asphalt Pavements

A Little Rock contractor is using an improved heater-planer to achieve high production rates in the rehabilitation of old bituminous pavements. The unit is used to remove the upper portion of the pavement prior to resurfacing.

Exceptionally high production rates were achieved this fall at two Air Force bases. At Ellsworth AFB, Rapid City, S. D., average production rate exceeded 100 tons of asphalt removed per hour; thickness of pavement removed was up to 4 in. At Truax AFB, Madison, Wis., the machine was used to remove a ¾-in. seal coat; 5,400 sq yd were planed in one hour on this job.

James A. Jackson designed and built the machine used on the two Air Force projects. His contracting firm specializes in planing, generally acting as a subcontractor on resurfacing contracts. The firm is reported to be the largest planing contractor in the U. S.

The contractor built the machine around a modified Caterpillar No. 14 motor grader; it weighs over 25 tons, is 43½ ft long and has operating speeds up to 125 fpm.

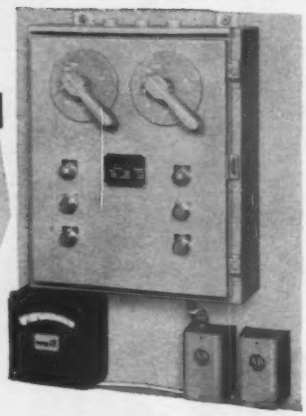
Major improvement over previous models is the heating arrangement. The furnace is 8 ft 6 in. long, 8 ft wide and 4 ft 6 in. high; it is lined with a Lite-Cast castable that reflects heat on to the pavement surface rather than heating the surface with a direct flame.

Six proportioning burners, capable of consuming 51 gph of No. 2 diesel fuel, provide heat. Air is provided by a turbo blower with a capacity of 950 cfm. Each burner has a propane gas-electric spark igniter. Three thermocouples are immersed in the combustion chamber and wired to a pyrometer mounted on the dashboard in front of the operator. This feature prevents possible overheating of the pavement surface.

Tempered steel cutting edges are mounted vertically behind the furnace in a "V" shape; width of cut is 8 ft. Apex of the V is to the rear and stripped material is windrowed in the center of the cut strip. A hydraulic loading device picks up material in the windrow and deposits it on a belt conveyor. The conveyor drops the material into a dump truck towed along backwards by the planer. The con-

the weil vis-a-trol

AUTOMATIC PUMP CONTROL and LIQUID LEVEL INDICATOR



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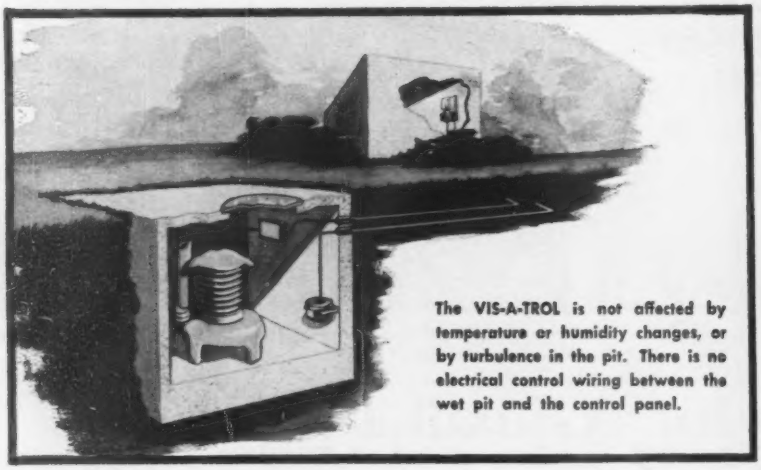
- Submersible sewage and sump pumps
- Vertical type sewage and sump pumps
- Septic Tank effluent pumps

The weil VIS-A-TROL automatic control system is combined with a depth measuring device which shows the depth of liquid in the pit. The pumping rate can be compared with the in-flow at all times without looking into the wet pit. It is indicated on the instrument and responds instantly to level changes in the sump.



The VIS-A-TROL is not affected by temperature or humidity changes, or by turbulence in the pit. There is no electrical control wiring between the wet pit and the control panel.

The VIS-A-TROL can be installed in outside weather-proof enclosures or installed within a building and may be located as much as 300 feet away from the pumping pit. High and low limits of liquid level control are set at the instrument. It is never necessary to go into the wet pit for control adjustment.

See your weil representative or send for Bulletin AC-100

See the weil VIS-A-TROL and other new weil products at Booth 954-958 International Heating & Air-Conditioning Exp. Feb. 13th to 16th.

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veyor can be folded for over-the-road movement.

A 15-kw generator mounted on the side of the machine supplies power to operate the attachments. A unique feature is the power source for the generator. Power comes from the grader engine through a power take-off, rpm output of the PTO is constantly changing, but the generator requires a reasonably constant input. To solve this problem, Jackson installed two variable pitch pulleys, in reverse of their normal application. They are actuated by an electric motor that is controlled by a speed sensitive switch. If the generator rpm's go below a preset range, the switch automatically activates the motor, which changes the ratio of the pulleys to an extent that the rpm's are again back in proper range.

Additional features to be incorporated in the new planer are a vacuum cleaner to pick up fine dust that sometimes remains when planing very dry pavements and a spray bar to apply a fog coat of asphalt in cases where the resurfacing will be delayed or where no cover coat will be applied.

Most recent job completed by the machine involved processing 61,000 sq yd of city streets in Corpus Christi, Texas. Bid price was $0.20 per sq yd.

Man-Sized Exhaust Pipe Made of Plastic Sheet

Workmen assemble what will be a 125-ft exhaust system made of corrosion-resistant plastic. A steel company plans to use the ducting to remove corrosive fumes from its zinc and tin plating lines.

The manifold is made of ¼-in. plastic sheet calendered from a special compound. Diameter of the ducting ranges from 22 in. at one end to 42 in. at the other. Corrosion Treatment Corp., Byesville, Ohio., made the installation; Seiberling Rubber Co. Plastics Div., Akron, Ohio, supplied the plastic.

(F&O continues on p. 65)

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Alcoa adds low-cost color to the benefits of building with aluminum. New Alcoa® Alumalure lets you choose from 11 standard colors of baked enamel on aluminum building sheet. Along with aluminum's traditional advantages—light weight, corrosion resistance and economy—you'll gain the exciting appeal of color that transforms any building into a showplace. Be among the first to get the facts on Alumalure*, Alcoa's latest contribution to architecture. A telephone call to your local Alcoa sales office will bring you complete information.

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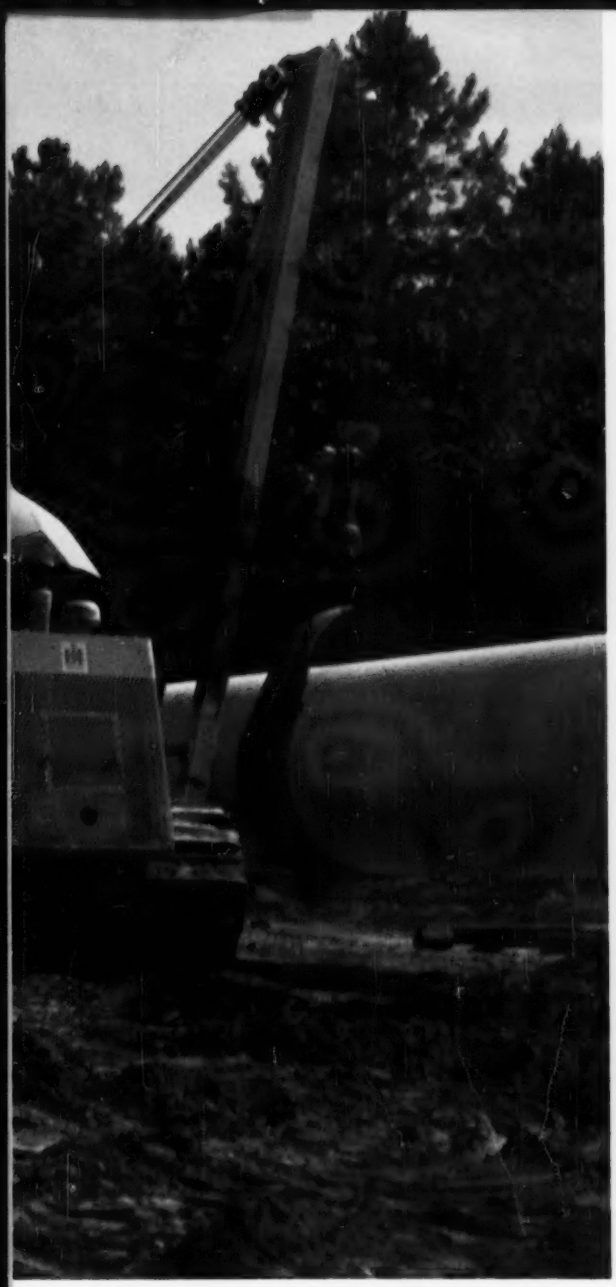
J. P. Neill strings 60-inch pipe over with never a breakdown...

Talk about tough pipe jobs! The J. P. Neill Company, Inc., as sub-contractor under Morrison-Knudsen Co., Inc., is shown laying a 60-inch water pipeline through hard rock and open pit coal mines, across two rivers, up and down slopes as steep as 120°. So far, the Dallas, Texas, contractor has moved at a steady clip —1,000 feet a day.

When completed, the new line will provide 75 million gallons of water daily for the city of Birmingham, Alabama. It will easily meet the urgent needs of industrial and domestic users.

Before the project started, Gulf engineers helped the contractor establish an effective maintenance program based on clean-working Gulf lubricants and clean-burning Gulf fuels. These products include: Gulflube® Motor Oil H.D., Gulf Super Duty Motor Oil, Gulf Diesel Fuel, Good Gulf® Gasoline, and Gulf Multi-Purpose Gear Lubricants.



Gulf lubricants and fuels help keep equipment delivering top performance as it wrestles 20,000-pound pipe sections over tough terrain.

Olan Jones, right, Superintendent, and Ed Johns, Gulf Sales Engineer, watch closely as a pipe-layer swings into position. No delays have been attributable to fuels or lubricants.

33-mile obstacle course

GULF MAKES THINGS RUN BETTER!

What about results? Olan Jones, Supt., answers: "Our pipe-laying tractors, trucks and welders operate 10 hours a day. They've all given top performance. Not one delay is attributable to lubricants or fuels."

Try Gulf fuels and lubricants on your next project. You'll soon see how Gulf makes things run better! Contact your nearest Gulf office for a quotation. For helpful maintenance tips, and information on Gulf products, write for 88-page "Contractors' Guide."

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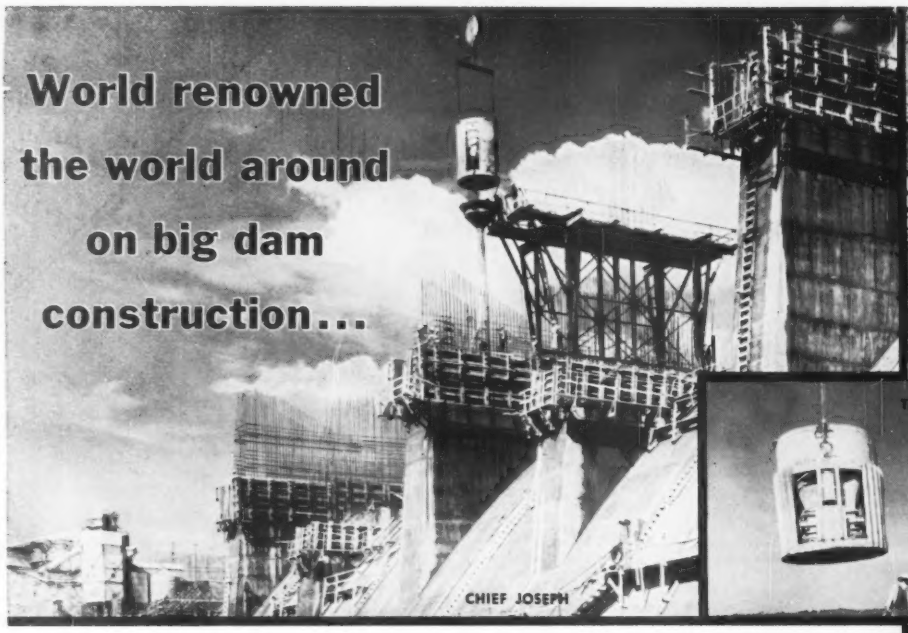
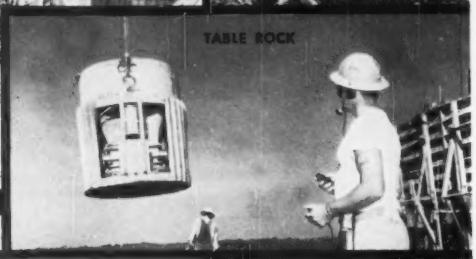
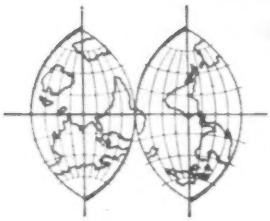
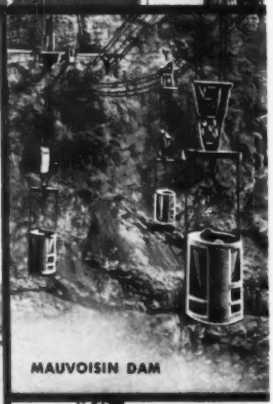






GAR-BRO CONCRETE BUCKETS

ON MORE THAN 80% of all large dam projects, Gar-Bro's big, heavy-duty concrete buckets have been used. Gar-Bro's remote controlled, air-operated gates and the new power operated crane hooks have become essential on these projects. As an innovation, Gar-Bro concrete buckets on cableways have been guided and controlled by closed circuit television and short wave radio.



GAR-BRO BUCKETS
helped build these dams:

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**Presently under construction—see Gar-Bro buckets in action.*

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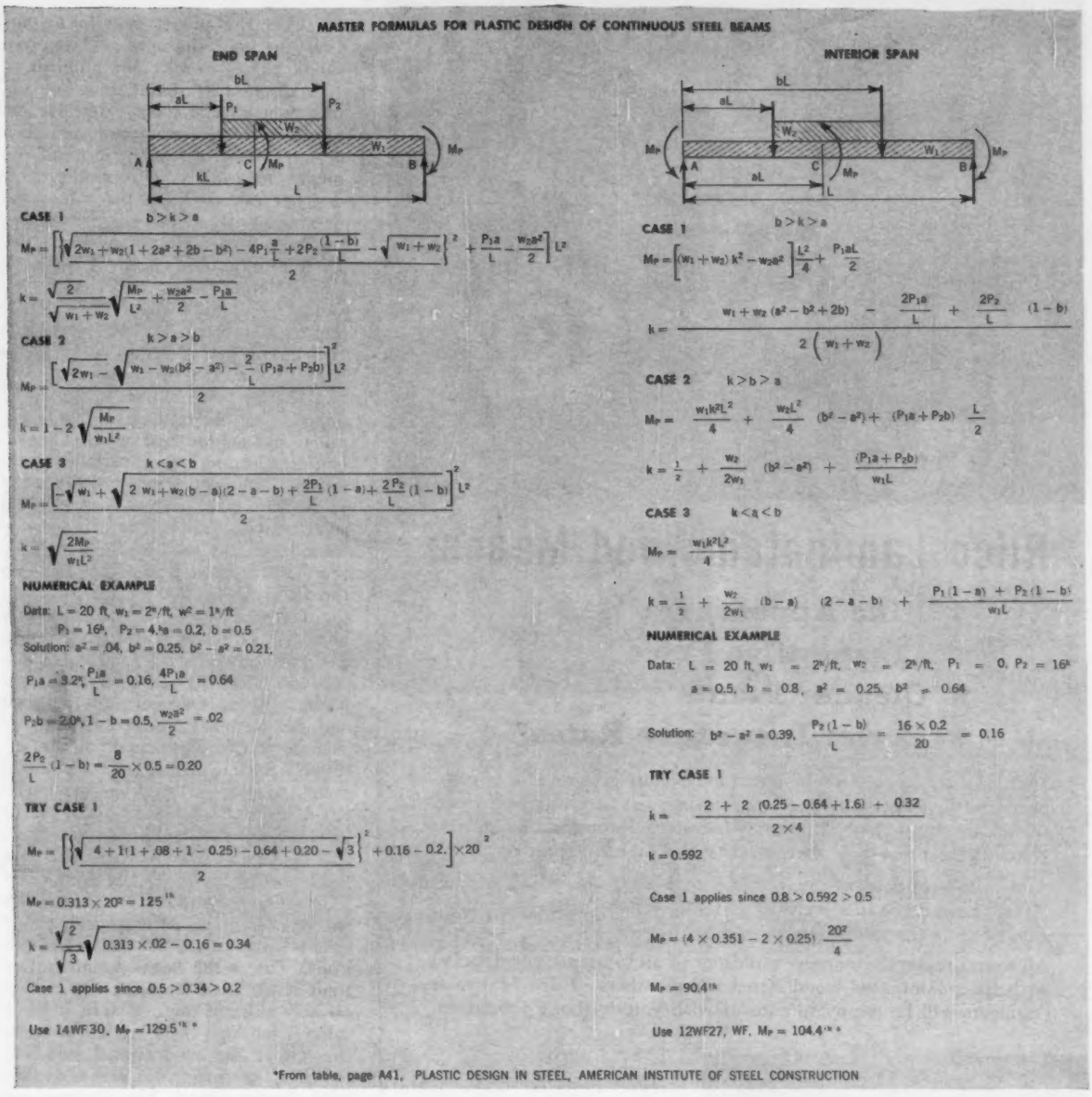
MASTER FORMULAS FOR PLASTIC DESIGN OF CONTINUOUS STEEL BEAMS
END SPAN
INTERIOR SPAN
CASE 1 b > k > a
CASE 2 k > a > b
CASE 3 k < a < b
NUMERICAL EXAMPLE
Data: L = 20 ft, w1 = 2k/ft, w2 = 1k/ft
P1 = 16k, P2 = 4.8k, a = 0.2, b = 0.5
Solution: a² = .04, b² = 0.25, b² - a² = 0.21,
P1a = 3.2k, P1a/L = 0.16, 4P1a/L = 0.64
P2b = 2.0k, 1 - b = 0.5, w2a²/2 = .02
2P2/L (1 - b) = 8/20 × 0.5 = 0.20
TRY CASE 1
Mp = [{√(4 + 1(1 + .08 + 1 - 0.25) - 0.64 + 0.20) - √3}² + 0.16 - 0.2.] × 20²
Mp = 0.313 × 20² = 125 ft-k
k = √(2/3) √(0.313 × .02 - 0.16) = 0.34
Case 1 applies since 0.5 > 0.34 > 0.2
Use 14WF30, Mp = 129.5 ft-k *
CASE 1 b > k > a
CASE 2 k > b > a
CASE 3 k < a < b
NUMERICAL EXAMPLE
Data: L = 20 ft, w1 = 2k/ft, w2 = 2k/ft, P1 = 0, P2 = 16k
a = 0.5, b = 0.8, a² = 0.25, b² = 0.64
Solution: b² - a² = 0.39, P2(1 - b)/L = 16 × 0.2/20 = 0.16
TRY CASE 1
k = (2 + 2 (0.25 - 0.64 + 1.6) + 0.32)/(2 × 4)
k = 0.592
Case 1 applies since 0.8 > 0.592 > 0.5
Mp = (4 × 0.351 - 2 × 0.25) 20²/4
Mp = 90.4 ft-k
Use 12WF27, WF, Mp = 104.4 ft-k *
*From table, page A41, PLASTIC DESIGN IN STEEL, AMERICAN INSTITUTE OF STEEL CONSTRUCTION

Master Formulas for Plastic Design

By F. G. Eric Peterson

When designing continuous steel beams by the plastic design method, an engineer must analyze each loading pattern separately by methods presently available. Master formulas for designing continuous beams under full loading appear in the above columns. With few exceptions, they are general solutions for combined uniform and concentrated loads on prismatic beams.

The ultimate plastic moment is M_p, and kL is the distance to the section C, the point of maximum moment measured from the left support. Loads are the product of design load multiplied by a load factor (1.85 by AISC recommendations).

Consider the formulas for an end span with left end hinged and right end restrained by negative moment M_p. Point C is first assumed between concentrated loads in the segment where a second uniform load acts (Case 1). The designer computes M_p, and then, substituting this value into the k formula, solves for k.

The value of k must agree with the assumed location of point C used in deriving the formulas for Case 1. If it does not, then the Case 2 or Case 3 formulas must be tried until the k value agrees with that assumed. Practiced judgment should enable the designer

Mr. Peterson, whose office is in Solano, Calif., has been a practicing consultant since 1946.

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★"Cleaner Plants"
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to select the proper case in his first trial in most instances. Two trials should suffice to solve any problem.

Solutions for interior spans are simpler than for end spans. Here the end reactions are the same as for those of a simple beam, because the end moments are equal and opposite. The designer can compute the value of k first, since the unknown M_p is not involved. He then inserts the solution for k into the formula for M_p.

The formulas can be extended beyond the loadings shown to include additional uniform loading over a portion of the span or additional concentrated loads. Uniform loading over a partial span that extends to the left of point C can be entered into the formulas in the form of w_1 in Case 2. Uniform loading over a partial span to the right of point C enters the formula in the form of w_1 in Case 3. Additional concentrated loads enter the general formulas in the form of P_1, Case 1, if they fall to the left of point C and in the form of P_2, Case 1, if they fall to the right of point C. These rules hold both for end spans and interior spans.

Concentrated loads P_1 and P_2, located at each end of the partial uniform load w_2, may occur elsewhere on the span and the formulas adjusted to suit. If their respective distances from the left support are cL and dL, then c and d merely replace a and b in the coefficients of P_1 and P_2 wherever they occur in the formulas. These coefficients still depend on whether the load falls to the left or to the right of point C.

Maximum positive moment may occur directly under a concentrated load if it is large compared to the uniform loads. This is the case if unsatisfactory trials result from assuming the section on both sides of the load (i.e., if the k value is too high for a section taken to the left of the concentrated load and too low, or imaginary, for a section taken to the right). The designer can solve for M_p from equilibrium equations.

Mathematical formulas for M_p when maximum positive moment occurs directly under concentrated load P_1 is:

$$M_p = \left(\frac{w_1 aL^2}{2} + P_1 aL\right)\frac{(1-a)}{(1+a)} + P_2 aL\,\frac{(1-b)}{(1+b)} + \frac{w_2 aL^2}{2} \times \frac{(b-a)}{(1+a)}\,(2-a-b)$$

If maximum positive moment occurs at load P_2, the formula becomes:

$$M_p = \left(\frac{w_1 bL^2}{2} + P_1 aL + P_2 bL\right)\frac{(1-b)}{(1+b)} + \frac{w_2 L^2}{2}\,(b-a)\,\frac{(ab+2b-a^2-2b^2)}{(1+b)}$$

17 ARMCO STEEL BUILDINGS SERVE CONTRACTORS AT NIAGARA POWER PROJECT

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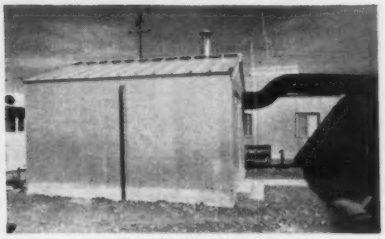
New steels are born at Armco

Turbine Parts Warehouse

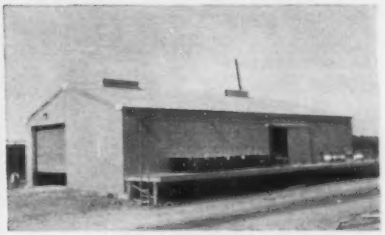
Maintenance Shop

Main Office Building

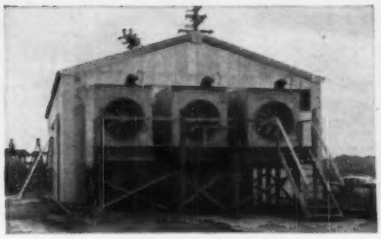
Shop and Warehouse



Heating Plant House



Oil and Grease Storage



Compressor House

Tire Service Building

Railroad Maintenance Shop

Ranging in size from 12 x 16 feet to 100 x 300 feet, Armco Steel Buildings serve contractor needs at the gigantic Niagara Power Project. Some buildings are pictured here.

While these are job-site installations, contractors also use Armco Steel Buildings for permanent offices and shops.

The *new* line of Armco Steel Buildings offers: new series of single-slope-roof structures; new choice of roof pitches for gable-roof buildings; wider spans and greater heights. Write us for details. Armco Drainage & Metal Products, Inc., 4331 Curtis Street, Middletown, Ohio.

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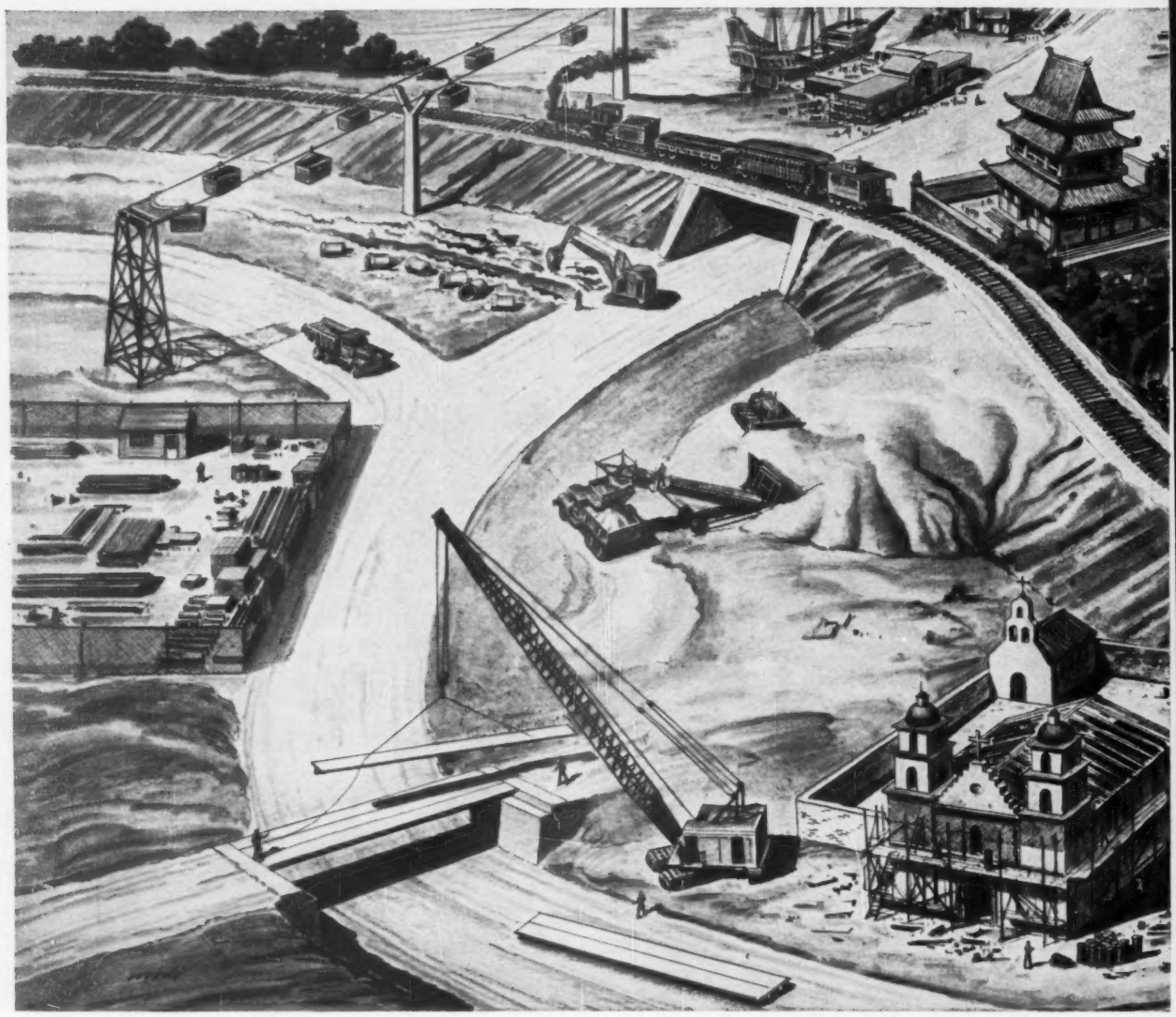


Past and future come to life... through construction skill and

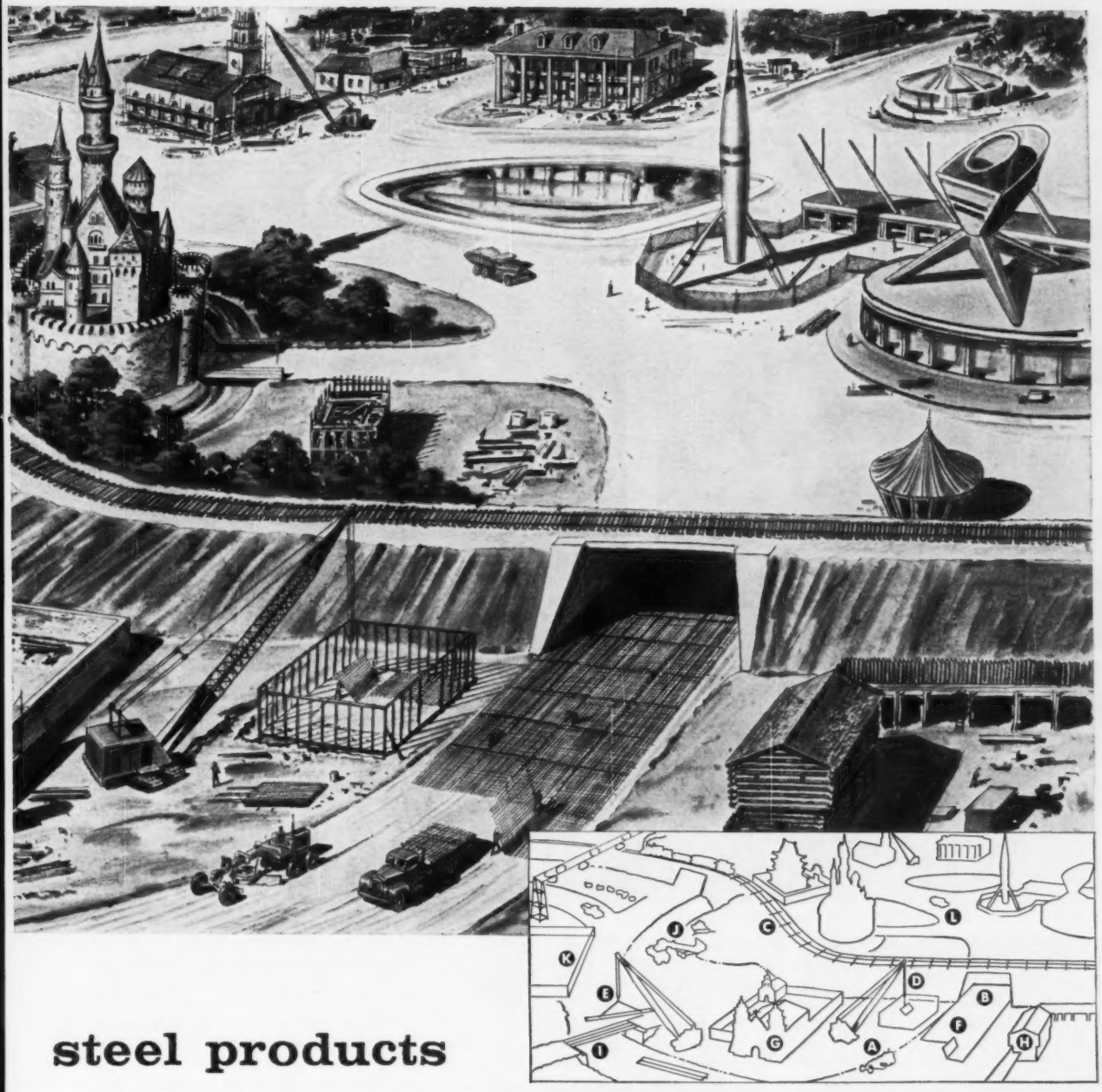
It takes more than a magic wand to build modern amusement centers. A far cry from the kiddy park of yesterday, the new educational park calls for vision, logical planning, coordination, construction skill and ton after ton of construction materials — including many different steel products.

CF&I — a nationwide steel company — supplies a number of dependable steel products for construction of amusement parks like the one shown above.

CF&I Grader Blades and Cutting Edges **(A)** level and smooth the craggy ground, converting an almost inaccessible wasteland into a workable area. *CF&I-Clinton Welded Wire Fabric* **(B)** adds extra strength to concrete roads, culvert pipes, buildings and parking surfaces, making the concrete more durable and crack-resistant.

The model train, like so many of today's fast-moving railroad cars, rides on *CF&I Rails* **(C)**. Cable cars glide through the air on *CF&I-Wickwire Rope* **(D)**, which is also widely used on cranes, trench hoes and carry-alls. Wickwire Ropes are selected because they last and have extra-high breaking strength.

The motto of contractors building such huge projects should always be: safety first. Consequently, they specify *CF&I-Wickwire Wire Rope Slings and Sling Attachments* **(E)** for hoisting jobs. And they insist on *Cal-Tie Wire* **(F)** for fastening road fabric, because this quality CF&I wire is available in handy reels which eliminate the hazards of tying with shoulder coils.



steel products

CF&I Lok-Twist Stucco Netting **(G)** strengthens the walls of many structures, while thousands of *CF&I Nails* **(H)** will hold wooden structures tightly for years.

CF&I Prestressed Concrete Strand and Wire **(I)** is chosen to give tensile strength to the prestressed concrete girders. And *CF&I Industrial Screens* **(J)** accurately classify sand and gravel.

CF&I-Realock Fence **(K)** protects equipment storage areas and is often erected around the entire park. Also, many of the trucks and service vehicles are equipped with *CF&I-Wickwire Automotive Springs* **(L)**.

On large and small construction jobs all over America, you'll see CF&I Steel Products. They can be counted on to do the job safely and at reasonable cost. Get complete information about any CF&I steel product by calling our nearest sales office, or write for Catalog G-104 "CF&I Steel Products for the Construction Industry." 7950

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Workmen place mesh on 2-in. slab course . . .

. . . weld mesh to bus bar with bronze rods and . . .

Wire Mesh Doubles As Heating

A heating system utilizing reinforcing wire fabric for resistance heating elements in a slab-on-ground is undergoing test in a warehouse built by Northern States Power Co. in Minot, N. D. The building will be subjected to "normal" temperatures, which in North Dakota can mean as cold as 40 below.

The unusual system eliminates the need for a furnace room and saves the cost of independent heat-radiating elements. The only additional material cost was for slightly heavier wire than would have been required for fabric serving only as reinforcing.

Six dry-type transformers step down the voltage from 208 volts to 20 volts in the networks of wire. Current enters each longitudinal band of 11 wires through copper bus bars, welded to the wire with a bronze rod in an acetylene welding process.

The current follows a U-shaped path down one width of fabric and back along an adjacent width to the transformer. Current flow is calculated at between 500 and 600 amps, with 45 to 55 amps in each of the 11 longitudinal wires in parallel in each fabric strip.

To allow adequate time and clean working space for the intermediate steps in construction, the designer specified construction of the floor slab in two stages. First, the contractor placed a two-in. thickness of concrete on top of the polyethylene vapor barrier, which rested on a compacted fill of 6 in. of selected gravel. After the mix set, the electrical contractor placed the fabric reinforcement. Welders then joined the fabric to the copper bus bars.

Major construction problem: how to lap the mesh to assure continuity of reinforcing and at the same time insulate the lapped fabric to maintain proper current flow.

Solution: strips of cement asbestos, ½ in. thick and 2 in. wide, placed between the layers of lapped fabric. Lengths of electrical scotch tape spaced at 12 in. wrap the asbestos strip and the fabric into a sandwich arrangement.

After the main cables had been bolted to the bus bars, the electrical contractor ran an electrical test to assure proper current flow through the grid.

Then the remaining 4 in. of concrete slab went down on the roughened surface of the base concrete.

The only departure from ordinary slab-on-ground placing was in the extreme care necessary to prevent displacement of the fabric or damage to the insulation. Usually wire fabric is supported or "hooked up" into the concrete to position it above the midpoint of the slab thickness, where it is most effective in controlling shrinkage or thermal cracking. In this case, however, the engineer decided to leave it in position on the 2 in. base slab, expecting slight upward displacement during the concreting operation.

Despite the low, 20-volt potential, Northern States Power engineers or-

insulate adjacent bands of mesh.

Element

dered insulation of any obstructions in the slabs and removal or detour of any wire in danger of touching a drain, conduit, plumbing, or other metal obstruction.

The electrical heating system is designed to emit 20 watts per sq ft in the warehouse area. This should produce a floor surface temperature of 80 deg. The office-shop area is designed for only 15 watts per sq ft because of the supplemental baseboard heat.

A system of thermostats—some embedded in the floor slab and others measuring inside and outside air—will control the temperatures. The thermostats will actually switch the transformers on and off.

Architect was James V. DeLoi of Minot. Designer of preliminary plans for the welded wire-fabric heating system was Kenneth O. Tompt, electrical consulting engineer of Fargo, N. D. General Construction Co. of Minot was general contractor.

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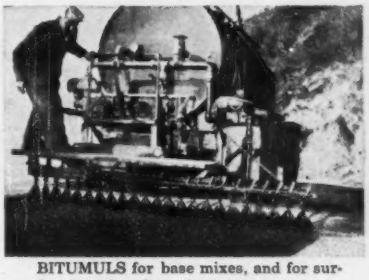

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Rugged pipe installs easily –even in a soggy bed

This 30″ cast iron pipe was installed for expansion of a water system in Memphis, Tennessee.

Despite heavy rains, the pipe went right to bed in wet trenches. Upon completion, the mains were tested at 150 psi for 12 hours and were found to be bottle-tight.

Cement-lined cast iron pipe prevents pipe-clogging . . . always delivers a full flow of water. Bottle-tight joints are tight enough to resist hundreds of pounds of pressure per square inch . . . yet flexible enough to permit deflection both during and after installation.

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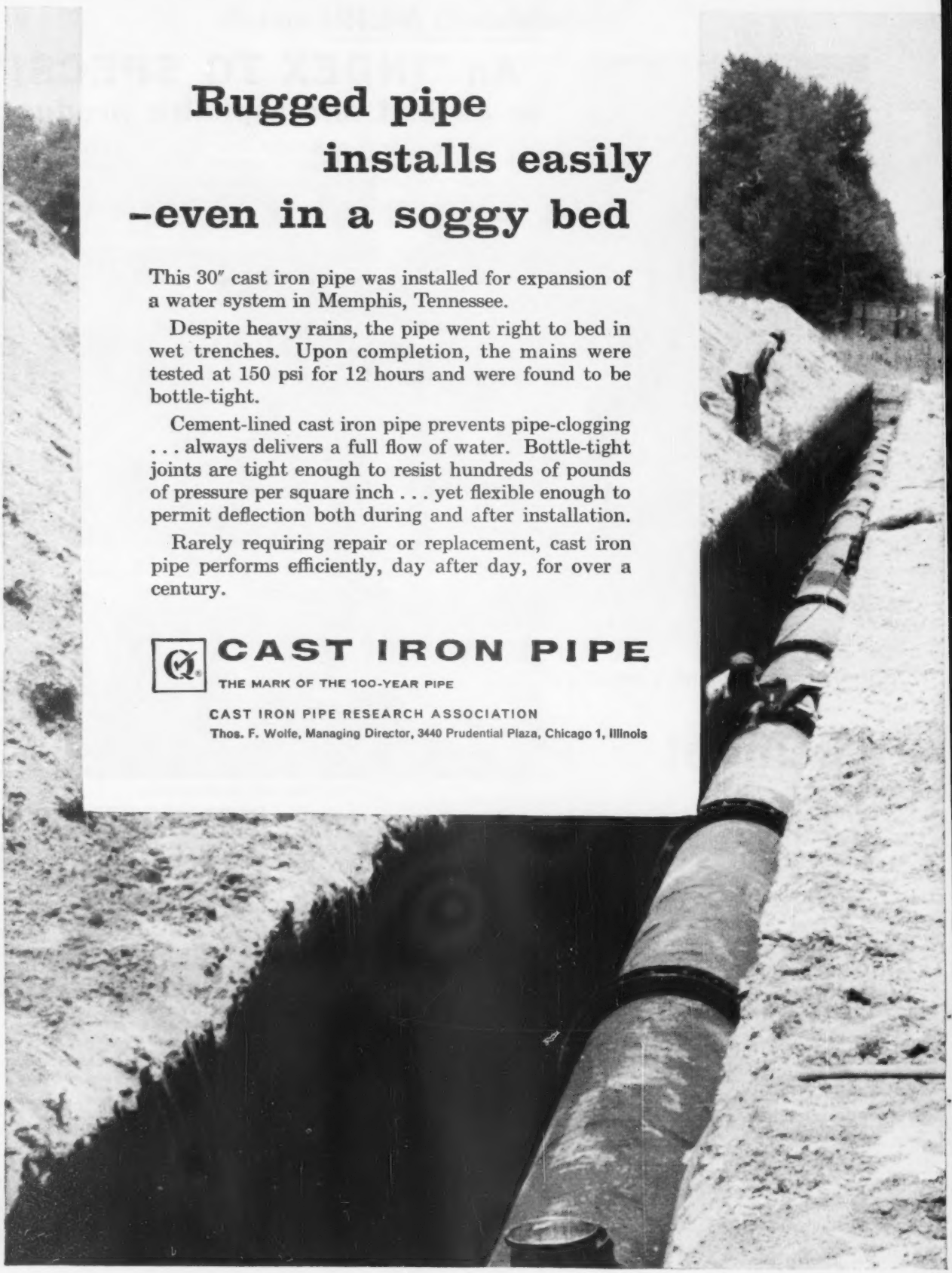

Concrete Placed at 30°F Below Zero Achieves Full Design Strength Using Thermo-Crete

Needs No Mechanical or Thermal Protection

More than 100 commercial projects and exhaustive field tests have confirmed results obtained in hundreds of laboratory tests conducted on Thermo-Crete over the last 18 months. Both programs give conclusive proof that when properly used, Thermo-Crete completely eliminates any possibility of damage to concrete poured at sub-freezing temperatures. Thermo-Crete, long in use to obtain high early strengths, protects concrete without costly necessity of tarpaulins, heaters or any other mechanical devices.

In addition to protecting concrete subject to temperatures as low as —30° F., Thermo-Crete considerably increases the strength of the concrete. When frozen in a plastic state, concrete containing the proper dosage of Thermo-Crete develops normal strength in 7 days and continues to gain in strength while frozen until design strength is reached.

When cured normally, Thermo-Crete achieves strengths well past those obtained by plain concrete of similar mix designs. In one instance core tests made after five years on normally cured Thermo-concrete showed a compressive strength of 6839 psi on a design mix of 3000 psi.

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October 27, 1960

Thermo-Crete Corporation
Los Angeles, California

Subject: Result of Test Program on Use of Thermo-Crete Additive in Portland Cement Concrete.

A continuous test program on Portland Cement concrete using Thermo-Crete additive has been in progress since December 1959. Plastic concrete specimens have been placed in freezing compartments maintained at uniform temperatures as low as -30°F for varying periods. The program of research is continuing. The following conclusions are based on the results of this test program:

1. No specimen when placed in freezer down to -30°F has been destroyed.
2. Specimens when removed from freezer have shown rapid increase in strength and reached or exceeded design strength of conventional concrete.
3. Specimens which have been subjected to alternate freezing and thawing were not destroyed.
4. Specimens containing Thermo-Crete attain twenty-eight (28) days design strengths in seven (7) days - when cured normally.
5. Specimens which are air cured for ten (10) hours before placing in freezer have considerably higher early strengths than those frozen in a plastic state and continue to gain in strengths when placed in freezer.
6. Specimens frozen in a plastic state down to -30°F reach normal strengths at seven (7) days and continue to gain in strength while remaining frozen, until design strengths are reached.

TWINING LABORATORIES OF SOUTHERN CALIFORNIA, INC.

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Proved Effective For Over Twenty Years

While the employment of Thermo-Crete to allow the placement of concrete in sub freezing temperatures is relatively new, it has been used for many years to obtain high early strengths and to waterproof installations. In these applications more than one million gallons of Thermo-Crete have been placed in residential, industrial and defense structures. 93,000 gallons were used in the construction of Park La Brea, a multi-unit, height limit housing project in Los Angeles. The product was used in installations made from 1942 to 1944 and to date have been outstanding not only in waterproofing, but also in materially aiding the strengths of the concrete.

Thermo-Crete is a liquid which is added to the water at the plant or to the batch at the job-site. The use of Thermo-Crete does not involve any changes in the normal procedures for mixing and placing concrete.

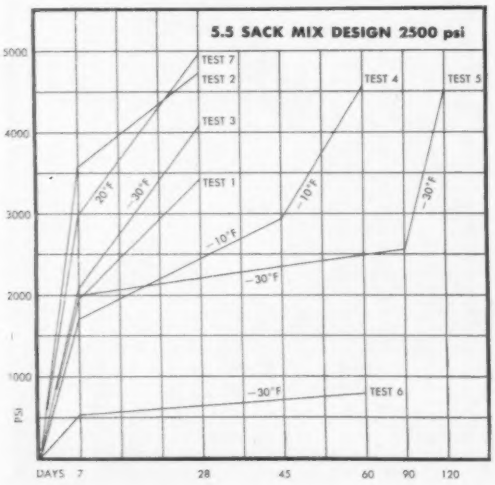
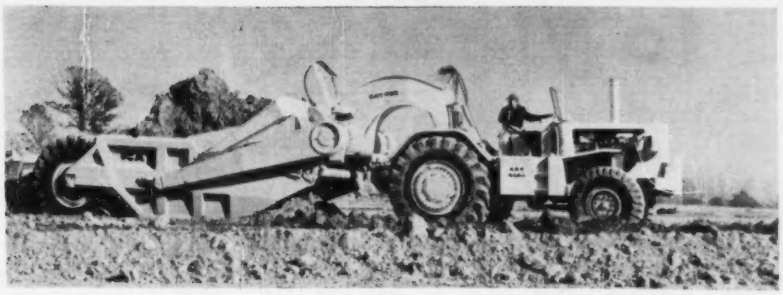


CHART LEGEND

1. **Test #C60-4023.** Plain concrete cured as per ASTM Designation C192-57 (moist conditions at a temperature of 73.4°F ± 3°F).
2. **#C60-3411.** Thermo-Concrete cured normally as above.
3. **#C60-2818.** Thermo-Concrete placed immediately in freezer cabinet maintained at —30°F. The seven (7) day test cylinders were removed and air cured at twenty-four (24) hours before testing. The twenty-eight (28) day test cylinders were removed from freezer cabinet at seven (7) days and cured as per ASTM for remaining period.
4. **#C60-157.** Thermo-Concrete placed immediately at —10°F. The seven (7), twenty-eight (28) and forty-five (45) day test cylinders were tested immediately upon removal from freezer cabinet. The sixty (60) day cylinders were removed from the freezer cabinet at forty-five (45) days and cured per ASTM for remaining period.
5. **#60-2818.** Thermo-Concrete placed immediately in freezer cabinet maintained at —30°F. The seven (7), twenty-eight (28), sixty (60) and ninety (90) day test cylinders were removed from freezer cabinet and were air cured for twenty-four (24) hours before testing. The one-hundred-twenty (120) day cylinders were removed from freezer cabinet and air cured for forty-eight (48) hours prior to testing.
6. **#C60-3336.** Plain concrete containing 2% $CaCl_2$ by weight of cement. Placed immediately in freezer cabinet maintained at —30°F. All test cylinders were air cured for twenty-four (24) hours prior to testing.
7. **#60-1033.** Thermo-Concrete placed immediately at 20°F for two (2) days then cured as per ASTM for remaining period.

For further information write:

THERMO-CRETE
corporation
426 South Spring Street, Los Angeles, California



Two Scraper Tractors Feature . . .

. . . Torque Divider Transmission

Two tractor-scraper combinations introduced by Caterpillar feature a torque divider power shift transmission that is credited with greatly increasing scraper efficiency.

The torque divider transmission combines planetary gear trains with a torque converter, and in the course of operation, automatically selects the most efficient transmission drive combinations.

The operator puts his shift lever into one of three speed ranges. Initially the transmission sends 25% of the engine torque through the converter, 75% to the power train. As the tractor picks up speed, the transmission shifts to a direct drive, then to overdrive. When maximum speed is attained in either of the two lower speed ranges, an indicator light tells the operator to shift to a higher range. The entire shifting procedure is then repeated automatically.

The principal advantage claimed for the shifting arrangement by the manufacturer is that it provides the greatest pull when the pull is needed, then automatically shifts to more efficient drives when the power need decreases and speed requirements go up.

For loading, the shift can be held in a loading range position which permits matching of scraper and pusher speeds.

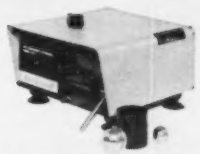
The torque divider transmission is included in Caterpillar's 630-A, a four-wheel tractor and the 631-A, a two-wheel tractor. Both units are powered by a four-valve-in-head diesel engine that has a maximum of 420 hp and flywheel rating of 335 hp. The scrapers for the two tractors have a capacity of 21 cu yd struck and 28 cu yd heaped.

For bigger operations, Caterpillar is teaming the 630-A tractor with a 482-C scraper. This combination, with a capacity of 28 cu yd struck and 35 cu yd heaped, is recommended only where loading is easy, hauls are long and grades are not too steep.

The 630-A tractor has a top speed of 41 mph; the 631-A, 31 mph. For both units, the scrapers are operated by an air-actuated, double-drum cable control. Steering is hydraulic but the 630-A has a mechanical follow-up that will provide for emergency steering should there be a hydraulic failure. On the tractors, easy maintenance was an important factor in design.

According to the manufacturer, all engine accessories can be removed without pulling the engine. The oil pans on both machines can be dropped with the engines in place. CATERPILLAR TRACTOR CO., PEORIA, ILL.

NEW



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The new Beckman Model 930 Air Comparison Pycnometer* is a revolutionary means of making volume measurements for accurate, fast *density* determinations of irregular, powdered and porous solids.

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• *Rugged*...portable...mechanical, requires no electric power.

For more information about this time-saving new technique for making *true volume, apparent volume, porosity,* and *density* determinations, contact your Beckman authorized laboratory apparatus dealer, or write for Data File E-5-23.

*PAT. PENDING

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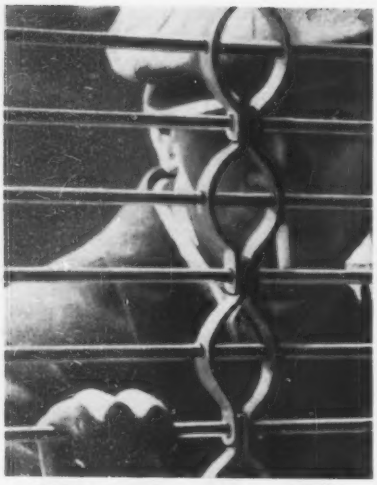

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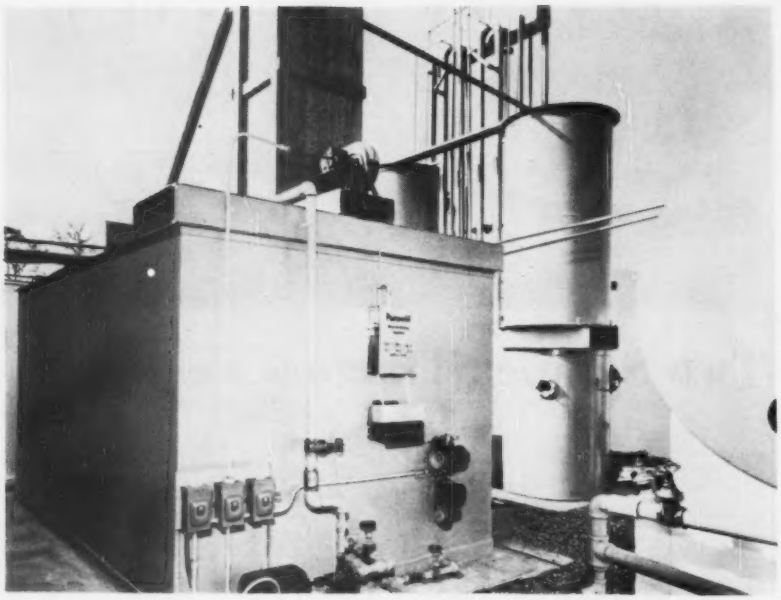


With precipitator as the heart of the process . . .

Packaged Plant Treats Water

Permutit Co. is putting water processing plants in tidy packages to serve areas remote from city waterworks. The firm has introduced a line of small plants to serve shopping centers, isolated suburbs, highway service stations and other units that are out of range of municipal water supplies.

Packaged plants will get water to these areas at relatively low cost, the company says. Design and engineering costs are low because the units are assembled from off-the-shelf standardized modular components; installation costs are low because local labor can do the job; and operation and maintenance costs are low because the units are essentially automatic.

One plant in Florida, designed to serve a trailer camp, swimming pool, restaurant and stores, was built by Permutit at a cost of less than $20,000. This 50-gpm plant includes a precipitator, two automatic valveless gravity filters, a degasifier and chemical feeders. The total plant takes up an area about 30 ft square (900 sq ft).

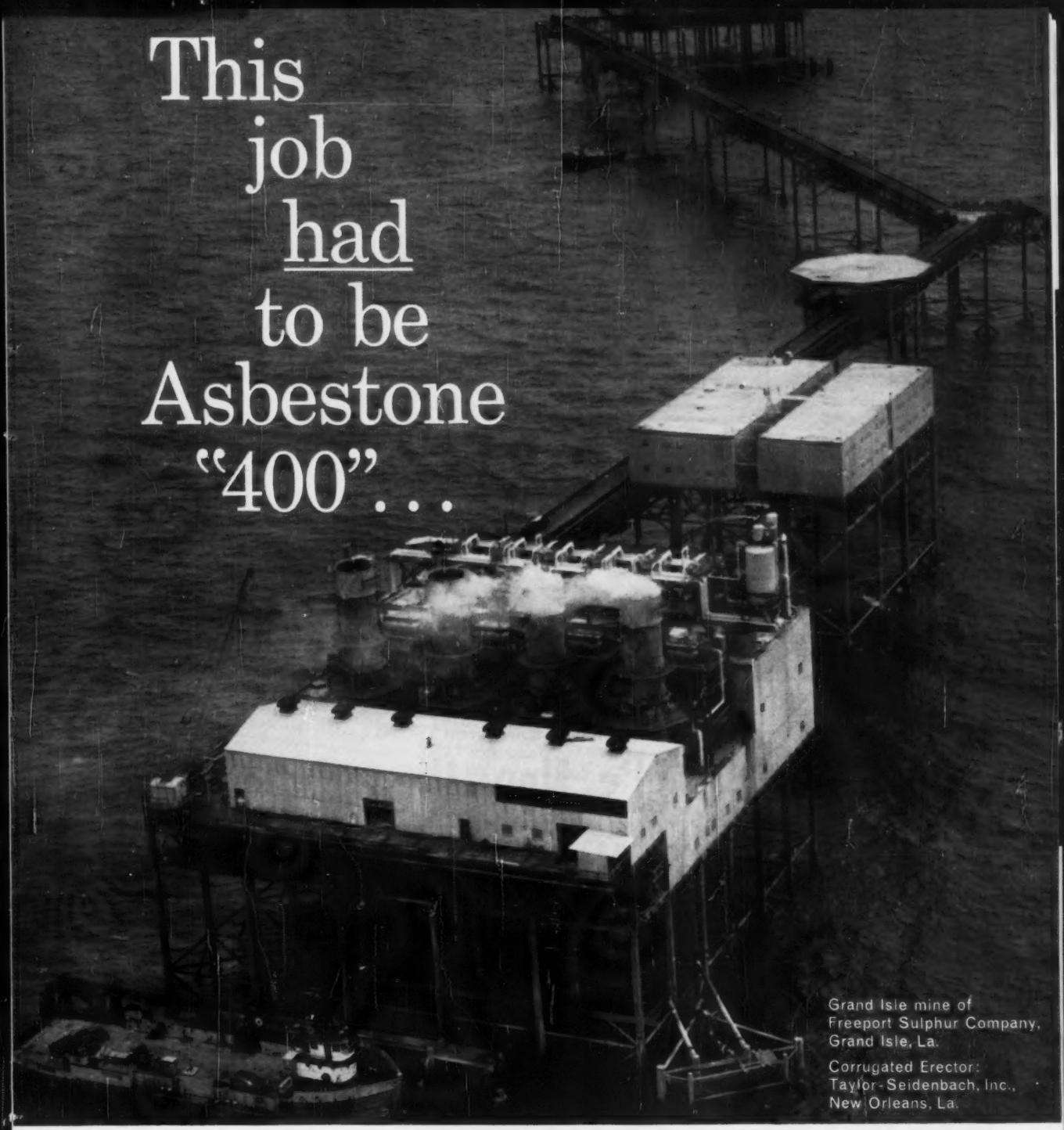
Not only are the plants useful in the hinterlands, but they also offer a simple solution to the problems of industrial processing plants that require especially pure water at one or a number of points in a process, says Permutit. The packaged water processing plant could be set up at the point of use.

With proper selection and juggling of components to fit the character of the source water, the plants can remove or reduce a wide variety of contaminants from both well and surface waters, including turbidity, hardness, minerals, bacteria, and objectionable odor, color and taste. Output rates vary from 10 to 100 gpm.

The biggest part of the processing job is done by the precipitator, which removes most of the suspended matter. Sometimes, before going to the precipitator, the water is treated in an aerator or degasifier. This step lowers acidity by reducing the carbon dioxide content; it also removes bad tastes and odors and oxidizes manganese and iron. The combination of chemical feeders and precipitators can then remove the oxidized iron and manganese, the hardness, suspended matter or discoloration. Chlorination for potability would also occur at this point.

The water is then sent through an automatic valveless gravity filter. This unit automatically backwashes and returns itself to service.

For potable water, the filter is the final stage. Industrial plants seeking greater purity for processing water can add softening and demineralization stages in which ion exchangers remove most of the remaining traces of dissolved compounds. A mixed-bed demineralizer completes the reduction of dissolved solids and a "polishing" filter removes any remaining traces of suspended matter. Permutit Co. Div. of Pfaudler-Permutit, Inc., 53 W. 43rd St. New York 36, N. Y.



Grand Isle mine of Freeport Sulphur Company, Grand Isle, La.

Corrugated Erector: Taylor-Seidenbach, Inc., New Orleans, La.

it's seven miles at sea!

The designers of the world's first off-shore sulphur mine had to plan for the corrosive effects of salt air, high humidity, sulphur fumes and occasional hurricanes. That's why buildings of this man-made island were made of Gold Bond Corrugated Asbestos-Cement. It shrugs off harmful chemical fumes, salt air and moisture, and it will not rot or burn. Always specify Gold Bond® Asbestone "400" when your buildings must resist rot, fumes and moisture. They go up fast and need little or no maintenance. Write Dept. EN-21 for complete technical literature.

NATIONAL GYPSUM COMPANY, BUFFALO 13, NEW YORK

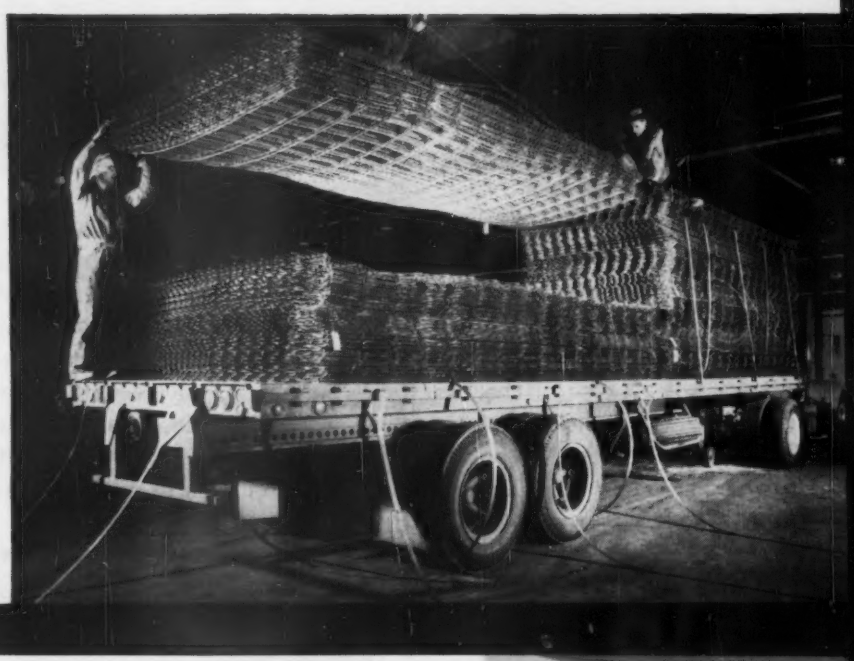
Gold Bond
BUILDING PRODUCTS

a step ahead of tomorrow

New Hinged Road Fabric from Pittsburgh Steel folds in slightly more than half the fabric's full width. Here in Glens Falls, N.Y., where Torrington Construction Co. of Connecticut is building a 14-mile strip of the $275-million Northway, Job Superintendent Patrick J. DiNatale shows how new fabric folds along hinge running length of the sheet.

Pittsburgh Steel's New Hinged Road Fabric Big Success On New York State's Northway

Contractor Saves About One-Third Installation Time



Ready to go at Pittsburgh Steel's Monessen, Pa., plant is a flat-bed truck loaded with new Hinged Road Fabric. Ordinary road fabric requires special cradling equipment and extra handling. Not so with Pittsburgh Steel's new Hinged Road Fabric: it's shipped folded flat and in weights up to 40,000 pounds per truck (depending on size and style), twice that of ordinary fabric. Shipments to Glens Falls took only a day.

A revolutionary new road fabric from Pittsburgh Steel Company simplifies shipping, speeds handling and cuts installation time on roadbuilding jobs by as much as one third.

The new product, called Hinged Road Fabric, provides the steel backbone for a 14-mile strip of New York State's gigantic, $275-million Northway linking Albany with Canada.

Hinged Road Fabric features an off-center hinge running lengthwise on each section. Roadbuilders using this product—one of several being introduced by Pittsburgh Steel—cite its built-in benefits during:

• **Shipping**—Because Hinged Road Fabric's novel hinge permits folding in slightly more than half the fabric's full width, it can be stacked easily within the eight-foot width limit of a truck bed or gondola. This makes special cradle trucks and cradling equipment unnecessary.

As a result, trucks can be loaded to capacity (subject to state weight restrictions)—up to twice the weight possible with ordinary fabric.

• **Handling**—A single section of Pittsburgh Steel Hinged Road Fabric can be handled easily by two men instead of the four usually required for unwieldy ordinary sheets.

• **Installing**—Because the sheet is not bent during shipping and stacking, new Hinged Road Fabric lies flat when installed.

At Glens Falls, N.Y., where 800 tons of Hinged Road Fabric were installed on the four-lane, 175-mile Northway, Torrington Construction Co.'s veteran roadbuilders added their stamp of approval.

Patrick J. DiNatale, the Connecticut firm's job superintendent, was especially enthusiastic about the one-day service on Hinged Road Fabric truck shipments from Pittsburgh Steel's Monessen, Pa., plant.

"We get terrific service from Pittsburgh Steel," said Mr. DiNatale. "It takes just one day for a shipment to get here.

"Ordinary fabric usually takes a week to ten days to arrive because it's handled by truck, rail and then truck again. That's because many counties and cities won't permit trucks with overhanging loads to pass through.

"Pittsburgh Steel's fabric is handled only once—and in one day in loads up to 40,000 pounds, not 20,000."

Torrington's field engineer, Robert B. Cunningham, is enthusiastic about Hinged Road Fabric's fast, easy handling. He said:

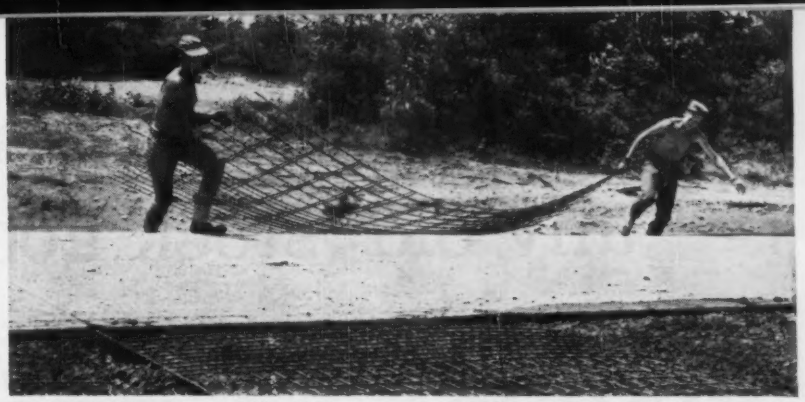
"I estimate that at the end of a working day this Pittsburgh Steel fabric saves us about one-third the installation time required with ordinary fabric."

The man directly in charge of the fabric's installation—Paving Foreman John Picciocca who has worked with all brands of road fabric for the last 12 years—had this to say:

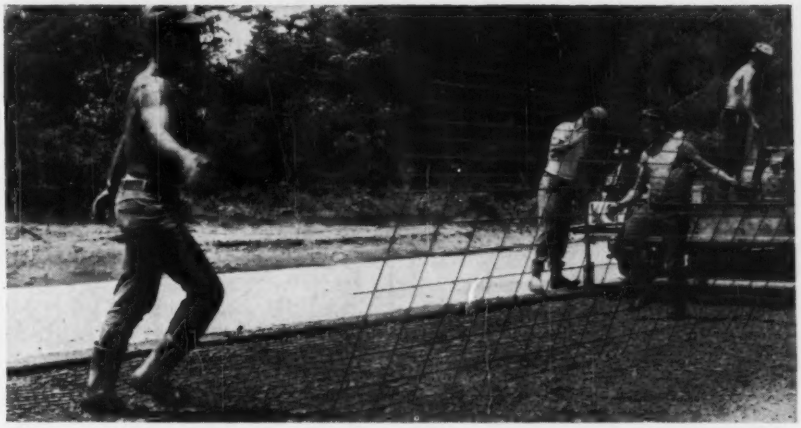
"What really sold me on Hinged Road Fabric is that it doesn't poke through the concrete while it's taking a set. That's a big problem with ordinary fabric. When that happens, you either have to cut the wire or repave the spot to cover the wire. That's murder on costs."

If you're in the roadbuilding business, you'll be dollars ahead—like Torrington—when you let Hinged Road Fabric provide fast, economical reinforcement on your next job.

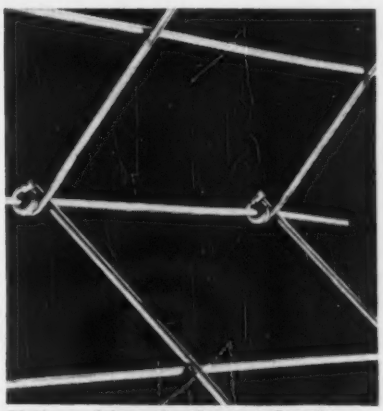
Contact your nearest Pittsburgh Steel Products sales office listed here.



On the job in Glens Falls, N.Y., a section of Hinged Road Fabric is handled easily and quickly by just two men.



Down goes Hinged Road Fabric in just seconds—and as flat as a living room rug.



Unique hinge is the result of two years' development work.

Hinged Road Fabric

Patents applied for

Pittsburgh Steel Products

a division of Pittsburgh Steel Company

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Is "any old" wire rope out of "any old" stock good enough?

Not when you can get what you need from the best combination of wearing qualities in the right Macwhyte!

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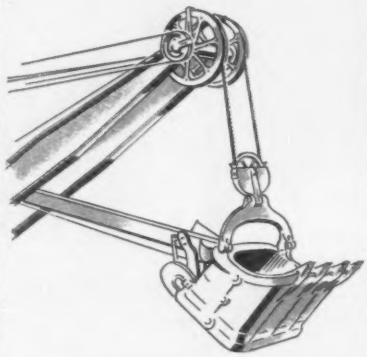
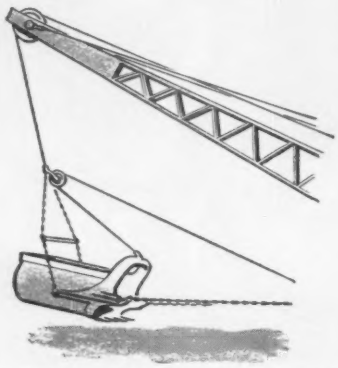


NEED RESISTANCE TO ABRASION?



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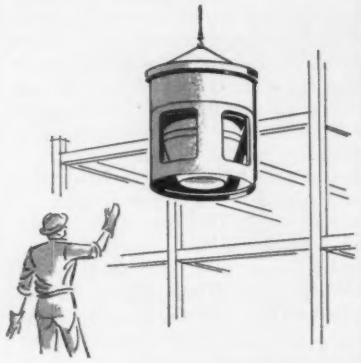
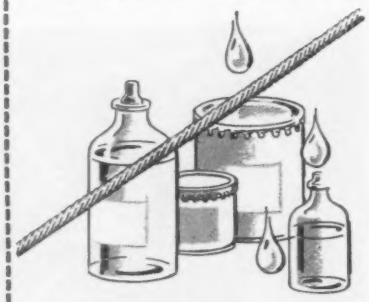
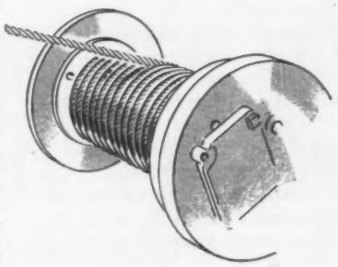


WHICH COMBINATION OF THESE WEARING QUALITIES DO YOU NEED?



NEED RESISTANCE TO CORROSION?

NEED RESISTANCE TO BENDING FATIGUE?



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You can place your trust in Macwhyte Distributors to give you the right wire rope for your equipment.

Macwhyte manufactures a thousand and one wire ropes to give you the right combination of wearing qualities your equipment demands.

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Obituaries

Russell Cone Dies, Worked on Golden Gate

Russell G. Cone, a civil engineer widely known for his work on bridges, including the Golden Gate Bridge in San Francisco, has died.

Mr. Cone began his career as a rodman on the 1915 construction of the Metropolis Bridge across the Ohio River near Paducah, Ky. After graduating as a civil engineer from the University of Illinois he went to work on the Delaware River Bridge at Philadelphia, becoming resident engineer in charge of construction by 1930. He was also resident engineer for the Ambassador Bridge at Detroit, the Tacony Palmyra Bridge near Philadelphia; the Golden Gate Bridge at San Francisco.

From 1937 to 1941 he was in charge of maintenance of the Golden Gate Bridge and Highway District, which he left to take part in the investigation of the Tacoma Narrows Bridge failure.

Still later in his career Mr. Cone was a vice president of Mason-Hangar and Silas Mason Co., New York. He directed construction of the Iowa Ordnance plant at Burlington, the Louisiana Ordnance plant at Shreveport, the Cornhusker Ordnance plant at Grand Island, Neb. and was project manager for the atomic tests at Frenchman's Flat in Nevada in 1950 to 1953.

William M. Angas, 68, retired Vice Admiral and former commander of the Seventh Fleet construction forces. Vice Admiral Angas retired in 1950 after a 32-year naval career to become chairman of Princeton University's Department of Civil Engineering. At his retirement from the Navy, he was director of the Atlantic Division of the Navy's Bureau of Yards and Docks. As commander of the Seabees during the last years of World War II, he was responsible for building many of the Naval bases in the Pacific islands. While at Princeton University, he helped establish the civil engineering department's course in rivers and harbors.

Kenneth W. Brown, 59, consulting engineer, San Francisco. He was a partner in the firm of Brown and Caldwell, specialists in sanitary engineering who recently completed a master sewerage plan for Seattle, Wash.

Clarence E. Ellsworth, 78, U. S. Geological Survey district engineer for Texas since 1918. His studies furnished basic water information to all developers of Texas water resources in the last three decades.

J. S. Bright, 82, retired deputy commissioner, U. S. Bureau of Public Roads. He retired in 1949 after a 48-year career in roadbuilding and administration, including 32 years with the BPR. During World War II, Mr. Bright was district engineer in charge of civilian forces building the Alaskan Highway.

Martin R. Huberty, 66, researcher in irrigation and soil science. He joined the faculty of UCLA in 1936 and became acting dean of the College of Agriculture, director of the Water Resources Center and professor of irrigation, soil science and engineering.

Harold S. Buttenheim, 84, editor emeritus of American City Magazine and a lifelong leader of city planning movements. He was an honorary vice president of the National Municipal League; past president of the American Society of Planning Officials; past president of the Citizens Housing Council and an honorary member of the International City Managers Association. Mr. Buttenheim's apprenticeship in trade journalism began in 1893 with the Street Railway Publishing Co., which later merged into what is now the McGraw-Hill Publishing Co.

Francis H. Phipps, 66, a senior engineer in the New York City Department of Public Works. He was assistant to the chief of the construction section of the department's division of buildings. Mr. Phipps had been with the department for 35 years.

Foster B. Crocker, 76, retired associate engineer of the New York State Department of Public Works at the Syracuse district engineers office. Before he retired in 1950, he spent most of his 45-year career working on New York State's canals.

Philip W. Burnham, 73, an architect who was associated with the engineering department of the Du Pont Co. in Wilmington, Del., for 15 years before his retirement in 1953. Before that he had established his own architectural firm to do business in New York City and Summit, N. J.

James L. Smith, 85, a New York City contractor who specialized in department stores. He built the Oppenheim-Collins stores in New York, Garden City, Cleveland, Pittsburgh and Philadelphia and the Bergdorf-Goodman, Bloomingdale's, Franklin Simon and Jay Thorpe stores all in New York City.

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a leading name for over 50 years

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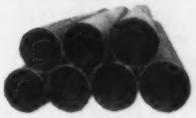

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561 S. PRINCE STREET - LANCASTER, PA.

Straight talk

on shovel-crane controls

ONLY ONE SHOVEL-CRANE MAKER FULLY UTILIZES TRUE POWER-HYDRAULIC CONTROLS

Until recently, other shovel-crane builders completely ignored power-hydraulic controls, or were content to merely augment their outdated mechanical controls with booster-type systems — so-called "power" controls. Only in the last few years have some of these manufacturers begun to offer a power-hydraulic control, *though strictly on a limited basis* . . . not on all models and not for all machine functions. Some machines even employ 3 different control systems.

Now look at Link-Belt Speeder. The company first pioneered power-hydraulic controls for shovel-cranes in 1936, 25 years ago. Then, in 1954, Link-Belt Speeder made this modern, proven Speed-o-Matic system standard on every machine in its wide line. Today, the controls are used for every machine function . . . *are the same on each and every rig.*

JUST NUDGE THE LEVER

The years-ahead Speed-o-Matic system employs the instantaneous force of oil under pressure — all the way from the control levers to the operating clutches. And, since oil is noncompressible, clutches respond the instant additional pressure is metered into the clutch lines. Absolutely no wait for pressure to build up.

Short-throw Speed-o-Matic control levers are panel-mounted for operator convenience and ease. By simply nudging one or more of these levers, a crane operator, for example, can boom up or down, hoist or lower a load, swing, travel . . . independently or in suitable combinations. And every machine response is **instantaneous, oil-smooth, precise!**

For example, on a machine equipped with reversing clutch (or clutches) on the operating drums, the Speed-o-Matic operator can power down the heaviest or lightest loads with hairline accuracy. Fingertip-sensitive control levers provide exact in-hand feel of the load.

AIR CONTROLS TEND TO LAG

How many manufacturers actually *recommend* air controls for crane work . . . especially on the swing . . . or on the hoist, for that matter? Waiting for pressure to build up can be serious business, resulting in a dangerous lag. The operator cannot expect the same degree of precision and safety as with instantly responsive power hydraulics.

With the Speed-o-Matic system, hydraulic lines are constantly full of oil, permitting the operator to meter the desired pressure to the various clutches without the hazards of waiting for build-up. For *more pressure,* he merely eases the lever forward (or reverse). To *release,* he returns the lever to neutral.

AIR CONTROLS DEMAND EXTRA SERVICE

Air controls, for one, present their share of servicing headaches. Dirt and moisture prove a major worry . . . not to mention freezing, filter maintenance and other downtime annoyances. And most components of these systems are purchased from outside sources.

The Speed-o-Matic system, on the other hand, is

unaffected by normal changes in temperature or atmosphere, and requires only seasonal oil changes. It's an open system, *with no need to prime or bleed.* Basically it's the same reliable system used on aircraft. And all components of this modern system (except pump) are designed and manufactured by Link-Belt Speeder.

POWER-ASSISTED CONTROLS FALL SHORT

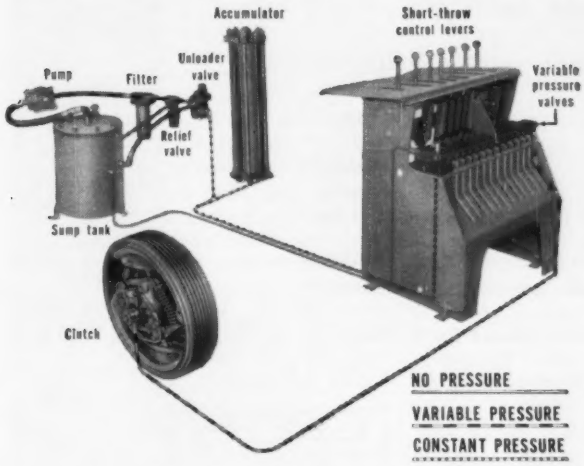
Manual hydraulic, air or mechanical booster systems offer a power assist to just a limited number of shovel-crane functions . . . **not all operations,** as with Speed-o-Matic. On some machines, to illustrate this point, only the main operating drums benefit from power controls, and on some mechanical booster systems, it is recommended that the booster be disengaged for crane work.

MECHANICAL CONTROLS DEPEND ON MUSCLE

Obsolete long-lever controls, of course, enjoy no power assist whatsoever. Still used on small machines, they are bulky and slow; they hand-fight the operator, contribute to his fatigue, hold down his production . . . require frequent adjusting. They simply do not compare to power controls.

SPEED-O-MATIC POWER-HYDRAULIC SYSTEM LETS OIL UNDER PRESSURE DO THE WORK

By means of variable pressure control valves, the operator meters oil pressure to each operating clutch. For more pressure, he lengthens the stroke of the lever to increase the force of the spring. This, in turn, moves the piston to admit more oil from the



valve bank. Response is prompt, positive and smooth. Pressure at the valve bank is kept constant (between 900 and 1050 psi) by the system's accumulator, which explains why the engine-driven pump operates against pressure only 5% of the time.

CLUTCHES SELF-ADJUSTING

Speed-o-Matic eliminates more than 150 working parts. There are no bushings, pins, links, clutch toggles. All actuating mechanism is oil-immersed. A micronic-type, replaceable oil filter keeps oil clean.

Interchangeable Speed-o-Matic clutches require far less operator attention. Even minor adjustments are spread weeks or months apart. Why? Hydraulic-actuated pistons automatically compensate for normal lining wear, heat expansion or temperature changes.

SPEED-O-MATIC CONTROLS MAKE EVERY JOB MORE PRECISE—FAR SAFER! This Link-Belt Speeder HC-98A truck-crane places forms, sets steel and pours concrete on high-reach assignments with pinpoint accuracy. Instantly responsive, Speed-o-Matic eliminates dangerous jump, jerk or lag.

PERFORMANCE AND PROFITS—A LONG-RANGE LOOK

Today, shovel-crane buyers simply cannot afford to relegate machine controls to secondary importance . . . cannot afford to buy experiments. A less efficient control system can penalize a rig in performance and profits for years to come.

See your local Link-Belt Speeder distributor for details, or write for illustrated literature. LINK-BELT SPEEDER CORPORATION, Cedar Rapids, Iowa.

1936 - 1961 . . . 25th ANNIVERSARY OF SPEED-O-MATIC CONTROLS

108-60N

LINK-BELT SPEEDER

It's time to compare . . . with Link-Belt Speeder

Prestress ties down pile caps on . . .

California's Bear River Bridge

Prestressed concrete piles extending from pile tips to superstructure caps provide overall design economy for California's Department of Public Work's Bear River Bridge. R. E. Hertel & J. R. Kettlewell, Sacramento, took the $869,263 contract to build both bridge and approaches with a price just 1.5% away from the second low, Baldwin Construction Co., Marysville, Calif.

The 1,525-ft bridge will be 40 ft high from bottom of piers to deck, and 32 ft in width from rail to rail. There will be a total of 24 spans—two measuring 46 ft and twenty-two measuring 65. All of the spans are T-beam and slab design, 4 ft 3 in. deep, and supported by three solid piers, three pile bents, and two shallow abutments on piles.

All items, except aluminum paint for the hand rail, will be supplied by the builder. Concrete will be class A—cement content 6 bags per cu yd.

Basic wage rates include: carpenters, $3.63/hr; cement masons, $3.77; concrete laborer (wet or dry), $3.145; laborer, $3.045; power shovel, crane, dragline, or clamshell operator, $4.31

The bidding included:

1C R. E. Hertel, & J. R. Kettlewell, Sacramento, Calif.	$869,263
2 Baldwin Contr. Co., Inc., Marysville, Calif.	882,226
10 Fredrickson Bros., Emeryville, Calif.	998,767
EE Department of Public Works, Division of Highways, State of Calif.	980,000

Bids: 9-7-60 Items	Unit	Quantity	Unit Prices 1C	2
Rail, guard, salvage	lf	790	$2.00	$1.50
reconstruct	lf	60	3.00	2.50
Bridge, remove	ls	job	18,000	5,500
Clear & grub	ls	job	17,000	30,000
Water, supply, develop	ls	job	4,500	22,000
apply	Mgal	13,000	1.25	1.35
Exc, roadway	cy	13,200	0.50	0.55
str	cy	2,085	2.50	3.25
str, tp A	cy	580	17.00	6.00
ditch	cy	14,800	0.70	0.75
Bf, str	cy	1,440	3.00	3.25
Compacting original grnd	sy	2,500	0.08	0.10
Borrow, imported	cy	267,000	0.41	0.41
Roadway, finish	ls	job	3,500	5,000
Aggregate, cl 2, subbase	t	19,500	1.10	1.40
base	t	26,200	2.50	2.75
Sand cover	t	45	6.00	4.50
Asph conc, aggr, tp B	t	8,000	4.75	5.10
open gr	t	1,120	4.75	6.00
paving	t	463	38.00	33.30
placing dikes	lf	2,500	0.40	0.25
placing misc	sy	15	2.50	3.50
liquid, SC-2, pri ct	t	57	40.00	43.00
emulsion, paint bind	t	18	40.00	50.00
Conc, piling, precast, prestr, f	lf	8,150	9.00	9.50
drive	ea	124	650.00	535.00
cl A, minor str	cy	45	90.00	70.00
bridge	cy	2,880	66.00	60.00
foot block	cy	126	30.00	35.00
Waterstops, rubber 6"	lf	196	2.50	3.25
Steel, reinf bar, bridge	lb	830,000	0.105	0.115
Metal, misc, bridge	lb	8,500	0.37	0.32
RCP cl III 12"	lf	84	3.50	3.25
18"	lf	108	4.75	4.35
24"	lf	248	6.25	6.00
36"	lf	448	9.50	10.30
42"	lf	196	12.00	13.00
oval, 30"x19"	lf	204	16.00	17.40
38"x24"	lf	84	17.00	19.50
42"x27"	lf	88	18.00	21.75

Bids: 9-7-60 Items	Unit	Quantity	Unit Prices 1C	2
RCP, cl III rubber gskt jt 18"	lf	300	5.50	6.00
CMP, bit ctd, 12-ga, 48"	lf	486	18.00	20.35
downdrains, 16-ga, 8"	lf	66	2.25	3.70
Tapers, entrance, 16-ga, 8"	ea	5	54.00	55.00
Anchor assembly 8"	ea	1	22.00	35.00
Downdrain slip jt 8"	ea	1	30.00	40.00
Conc flared end section 24"	ea	3	75.00	75.00
36"	ea	2	185.00	185.00
42"	ea	2	250.00	250.00
Gate, drainage, auto 24"	ea	1	150.00	135.00
MH, frame & cover	ea	1	150.00	100.00
Cobblestones	t	78	6.00	7.50
Fence, property tp BW	lf	1,550	0.65	0.65
tp WM	lf	1,640	0.70	0.80
Gates, property fence 10"	ea	2	60.00	55.00
12"	ea	4	90.00	65.00
Monuments, survey	ea	12	30.00	20.00
Markers	ea	218	7.00	7.00
Rail, metal beam guard	lf	960	4.00	4.50
barrier, tp 2	lf	3,108	10.00	9.30

Completion time: 175 working days
Liquidated damages: $225 per day

Lowest Bid for Excavation Takes Street Paving Award

With a price of 35 cents per yard for excavation, under-bidding it's closest competitor by 25 cents, Cornhusker Paving Co., Omaha, took this $152,683 street paving contract for Sanitary & Improvement District No. 57 with a total bid just $1,335 under the second low.

But concrete prices put all four entrants well above engineer Lamp, Rynearson & Associates' estimate. Prices bid for the 34,867 sq yd of 7-in. concrete were from $0.35 to $0.71 a sq yd higher than the engineers price for the same item.

The concrete pavement containing 6½ bags of cement plus Nebraska sand and gravel, will be placed in 26- and 34-ft widths with integral curbs. The job is in a residential area about 20-miles west of Omaha.

Prevailing wage rates for paving jobs in the Omaha area include: sawmen, $3.425/hr; carpenters, $3.30; cement masons, $3.275; concrete saw operator, $2.55; common laborers, $2.40; pipe layers, $2.65; single axle truck drivers, $2.45; oiler, greaser, & mechanic's helper, $2.40; concrete finishing machine operator, $3.00/hr.

The bidding included:

1C Cornhusker Paving Co., Omaha, Neb	$152,683
2 Rogers Construction, Inc., Omaha, Neb	153,918
4 Parks Construction, Omaha, Neb	160,958
EE Lamp, Rynearson & Assocs., Omaha, Neb	140,803

Bids: 9-13-60 Items	Unit	Quantity	Unit Prices 1C	2
Excavation, common	cy	7,117	$0.35	$0.60
Conc, paving, uniform thk 7"	sy	34,867	4.09	4.05
curb	lf	21,471	0.30	0.35
header	lf	112	1.20	1.00
Sew, san, adj to grade MH	ea	30	25.00	20.00
cleanouts	ea	3	20.00	20.00
Flumes	ea	2	100.00	75.00

Completion time: 93 working days
Liquidated damages: $100 per day

Piling Takes a Third of Pennsylvania Dam Costs

A low of $26,374 won this dam repair and modification contract for Wagner Construction Co., Kingston, Pa. Since the dam is located in an underground coal mining area, the dam embankment has been previously excavated above the 7x7-ft. conduit to determine the extent of foundation subsidence.

The successful bid was 26% under the second low and 58% below the high of four bidders. Bourquard, Geil & Associates are the consulting hydraulic engineers for Pennsylvania's Department of Forest & Waters on this Wadham Creek Flood Protection Project, Plymouth, Pa.

About 32% of Wagner's price will go for 4,700 sq ft of sheet piling for a cutoff wall. The low of $3.15 a sq ft was well below the competition's bids of $4.15, $5.00, and $6.00 a sq ft. Once embankment repairs are completed, the wall—of Bethlehem AP 3 or equal—will be driven to rock.

The job also includes repairing the existing 30-ft-high by 515-ft-long dam, placing a new concrete collar on sections of the 7x7 ft conduit, building a low flow intake structure, and replacing earth embankment and rock fill.

Minimum wage rates include: skilled labor, $3.15/hr; semi-skilled, $2.55; common, $2.05; journeyman carpenter, $2.95; carry all operator, $2.75; and mechanic, $2.70/hr.

The bidding included:

1C Wagner Construction Co., Kingston, Pa	$26,374
2 B. G. Coon Construction Co., Luzerne, Pa	33,250
4 PennLac Contracting Co., Dunmore, Pa	41,728
EE Bourguard, Geil & Associates, Harrisburg, Pa.	28,995

Bids: 9-30-60 Items	Unit	Quantity	Unit Prices 1C	2
Excavation, common	cy	500	$2.50	$2.00
structural	cy	100	9.00	10.00
borrow	cy	700	1.00	1.00
rock	cy	5	25.00	25.00
Embankment, rolled	cy	900	1.50	0.90
Rolling, additional	hr	8	12.00	8.00
Backfill, compacted	cy	80	4.00	3.00
Seeding	acre	0.1	500.00	1,800
Concrete, class A	cy	30	80.00	80.00
Steel, reinforcement	lb	2,500	0.20	0.16
Gravel drain	cy	50	5.00	7.50
Pipe, drain 4" ϕ	lf	170	1.70	1.50
Piling, steel sheet tp Ap-3, MP 115, or eq	sf	4,700	3.15	4.15
Drilling & grouting dowels in rock	lf	16	4.00	6.00
Metalwork, miscellaneous	lb	1,200	0.60	0.40
Filter, sand	cy	35	5.00	8.00
Aggregate, course, #2	cy	60	5.00	9.00
#3A	cy	50	5.00	10.00
Fill, rock	cy	200	8.00	12.00
Pipe installation, intake structure	ls	job	300.00	1,900

Completion date: 1/1/61
Liquidated damages: $50.00 per day

Bethlehem announces . . .

11

NEW LIGHTWEIGHT WIDE-FLANGE BEAMS!

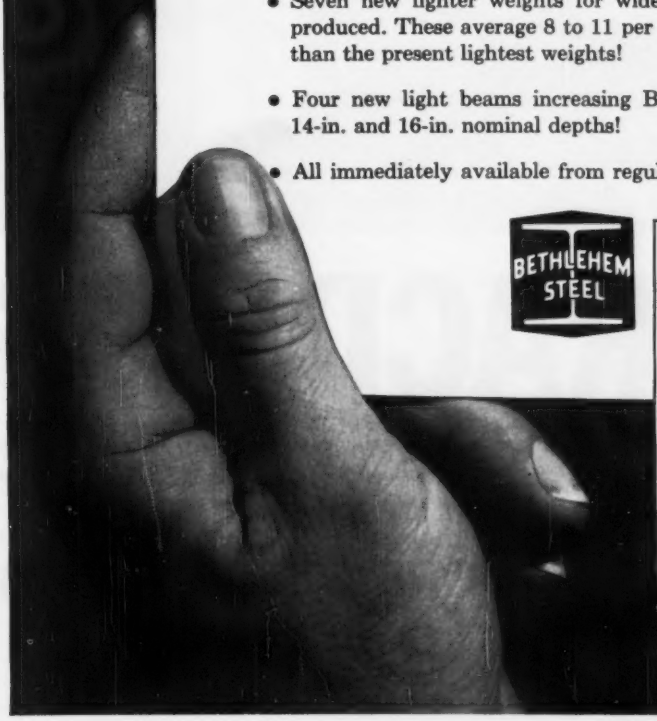
. . . for still greater economy in steel construction

Steel

for Strength . . . Economy . . . Versatility

These new sections, combined with the new ASTM Specifications for higher-strength steels (A36, A440, A441), will provide still greater flexibility and economy in steel construction.

- Seven new lighter weights for wide-flange beams currently produced. These average 8 to 11 per cent less weight per foot than the present lightest weights!
- Four new light beams increasing Bethlehem's BL series to 14-in. and 16-in. nominal depths!
- All immediately available from regular rolling schedules!



free booklet gives all details

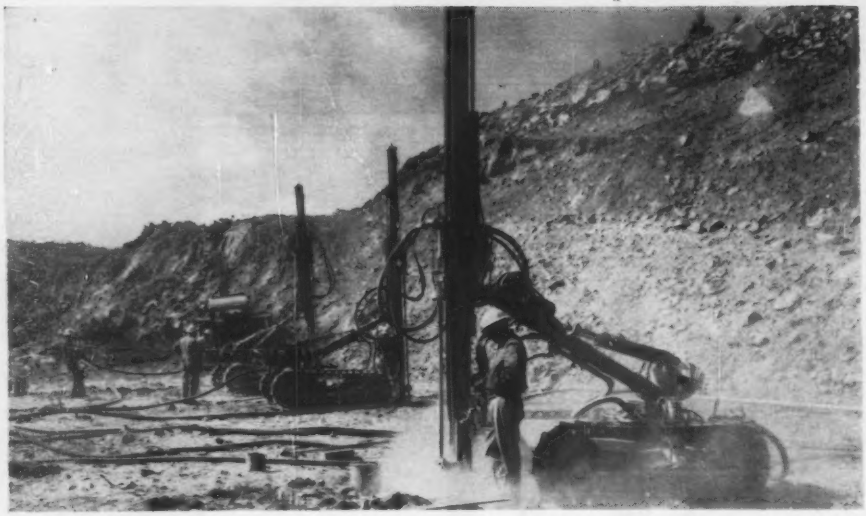
BETHLEHEM STEEL

PUBLICATIONS DEPARTMENT
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

Please rush me a copy of Booklet 582, "11 NEW LIGHTWEIGHT WIDE-FLANGE BEAMS."

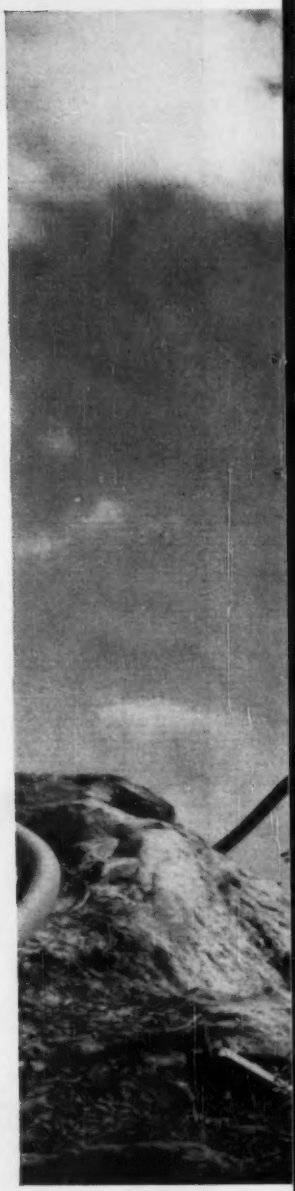
Name .....
Company .....
Address .....
City ..... *Zone* .... *State* .....

Export Sales: Bethlehem Steel Export Corp., 25 Broadway, New York 4



G-900 TRACDRILS with "Hydra-poise" knee-action have unmatched maneuverability and stability to sink blast holes in any formation. Independently operated, extra-long crawlers provide 1350 square inches of ground contact. Two sets of grouped controls – one at turret, the other at boom end – save time and steps for driller.

THIS BATTERY of CP-500 "Power Vane" Rotary Compressors feeds air to a group of G-900 Tracdrils. They supply the "Go-Power" for the toughest jobs with portability and "hands-off" operation.



G-900 TRACDRILS

PROVE THEIR POWER AND STAMINA IN THE TOUGHEST TERRAINS AND FORMATIONS . . . AND THEY CAN DELIVER MORE BLAST HOLES PER SHIFT FOR YOU!

When you're stuck with treacherous footing and hard rock, you have a job for Chicago Pneumatic G-900 Tracdrils and "Power Vane" Rotaries.

Operators find the new G-900 a driller's drill. It's got everything a driller expects from a high production rig... plus some real exclusives, too! It can drill directly alongside tracks with 180° full swing. It handles horizontals 11 feet high at the face, or snake holes at ground level. And you can't beat the G-900 for safety. Release the throttle and heavy-duty brakes lock automatically . . . keep drill from shifting or creeping . . . hold hard on really bad ground.

If you back-up your G-900's with the rugged, always reliable CP-600 "Power Vane" Rotary Compressors that have the "Go-Power" to meet every air demand, you can lick the toughest formations you'll ever find. Write for Bulletin SP-3267 on the revolutionary G-900 Tracdril to: *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

Chicago Pneumatic

TRACDRILS • AIR COMPRESSORS • PNEUMATIC TOOLS • AIR WRENCHES • REICHdrills

Labor and Materials Prices Monthly Market Quotations by ENR Field Reporters

HOURLY WAGE RATES—Base rate + fringe benefits

	Common Labor: Building	Common Labor: Heavy Const	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Electrical Workers	Steamfitters	Truck drivers: 1½ T	Truck drivers: under 4 cy	Truck drivers: over 4 cy
Atlanta	$2.00	$2.00	$4.00	$3.35	$3.00+7½¢	$3.675	$3.50+3¢	$4.00+5¢	$3.85+22½¢	$2.10	$2.20	$2.50
Baltimore	2.27+7½¢	2.27+7½¢	4.10+15¢R	3.60+7½¢	4.00+17.8¢	3.35/4.05+10¢A	3.85+10¢R	3.85+7½¢	3.84+17.5	2.20+07¢R	2.20+07¢R	2.20+07¢R
Birmingham	1.95	2.05	4.05	3.23	3.65+10¢	3.30	3.37	3.65	3.70+12¢	2.00	2.20	2.45
Boston	2.75+10¢	2.65+10¢	4.05+30¢	3.65+10¢	4.14+20¢	4.05+20¢	3.80+45¢	4.10+25¢	3.95+27¢	2.70+23¢	2.70+23¢	2.70+23¢
Chicago	3.02½+7½¢	3.02½+7½¢	4.225+10¢	3.91+20¢	4.35+16¢	3.90+5¢	4.00+27¢	4.30	4.10+25¢	2.68+21.4¢	.....	.....
Cincinnati	2.90	2.80	4.025+12¢	3.90	3.95+10¢	3.575/3.80A	3.875+.01	4.09+.511	4.10+9½¢	2.65+62½¢	2.70+6½¢	2.75+6½¢
Cleveland	3.37	3.285	4.085+10¢	4.11	4.01+10¢	4.11	4.11	4.17	3.91+20¢	2.92+15¢	2.92+15¢	2.92+15¢
Dallas	1.85	1.85	4.15	3.50	3.55+7½¢	3.65	3.875+10¢	3.625+7½¢	3.70+8½¢	1.80/2.625	1.80/2.625	1.80/2.625
Denver	2.32	2.32	4.00	3.65	3.71+10¢	3.25	3.80+12¢	4.05+47¢	3.95+10¢	2.40/2.60	2.75	2.90
Detroit	2.90+34¢	2.90+34¢	3.98+33¢	3.63+46¢	4.00+27½¢	3.63+39½¢	3.75+41¢	4.00+52	3.90+51¢	3.03+175¢	3.03+175¢	3.03+175¢
Kansas City	2.58	2.63	4.075	3.625	3.775	3.57	3.875	3.90+427¢	3.85+245¢	2.555	2.555	2.63
Los Angeles	3.08+10¢	3.08+10¢	4.20+25¢	3.825+20¢	4.27½+25½¢	3.81+20¢	4.25+42½¢	4.65+46	4.33+64¢	3.365+10¢	3.365+10¢	3.555+10¢
Minneapolis	2.85	2.98	3.875+15	3.50+15¢	3.62+15¢	3.60+33¢	3.65+33¢	3.70+44¢	3.62+37¢	2.85	2.85	3.00
New Orleans	1.92½	2.00	3.72½+7½¢	3.30	3.60+10¢	3.425+7½¢	3.34+5¢	4.00+7½¢	3.80+71¢	3.425+7½¢	3.425+7½¢	3.375+7½¢
New York	3.55+28¢	3.55+28¢	5.00+61¢	4.65+37¢	4.95+69¢	4.90+39¢	4.70+67¢	4.40+1.20	4.65+60¢	3.275+28½¢R	3.275+28½¢	3.275+28½¢
Philadelphia	2.60+15¢	2.55+10¢	4.25+17¢	3.885+15¢	4.45+23¢	4.055+20¢/4.345+20¢A	4.15+20¢	4.52½+17¢	4.20+31½¢	2.45+15	2.45+15½¢	2.45+15
Pittsburgh	2.735+20¢	2.55+20¢	4.50+20¢	4.125+20¢	4.30+20¢	3.73+20¢	4.225+20¢	4.60+31½¢	4.20+20¢	2.56+20¢	2.635+20¢	2.735+20¢
St. Louis	2.925+10¢	2.925+10¢	4.25+33¢	3.875+10¢	3.875+10¢	4.00	4.00+07½¢	4.11+50¢	4.27½+25½¢	2.93+15¢	3.13+15¢	3.23+15¢
San Francisco	3.045+10¢	3.045+10¢	4.40+42½¢	3.725+36¢	4.275+25¢	3.80+35¢	3.79+63¢	4.22+29¢	4.36+72¢	3.79+11¢	3.27+11¢	3.08+11¢
Seattle	3.00+25¢	3.00+25¢	4.15+30¢	3.53+20¢	3.76+10¢	3.84+20¢	3.72+30¢	3.95+27¢	4.14+29¢	3.40+20¢	3.40+20¢	3.60+20¢
Montreal	1.75+4¢	1.75+4¢	2.53+6¢	2.35+5¢	2.55+6¢	2.35+5¢	2.65+6¢	2.45+5¢	2.62+6¢	1.75+4¢	1.75+4¢	1.75+4¢
Toronto	2.00+8¢	2.00+8¢	3.20+13¢	2.95+12¢	3.05+12¢	3.20+13¢	3.20+21¢	3.52+14¢	3.47+13¢	2.05+18¢	2.05+15¢	2.05+15¢

	Tractor Operators—Incl. bulldozers: 34-49 hp	70-100 hp	100 & over	Tractor scraper 15-16 cy	Power cranes & shovels: ½ cy	¾ cy	Motor grader oper	Air comp oper	Air tool oper
Atlanta	$3.15	$3.15	$3.15	$3.15	$3.675	$3.675	$3.15	$2.825	$2.22
Baltimore	3.65+10¢	3.65+10¢	3.65+10¢	3.65+10¢	4.05+10¢	4.05+10¢	3.85+10¢	3.25+10¢	2.325+7½¢
Birmingham	3.30	3.30	3.30	3.30	3.30	3.30	3.30	2.89	2.15
Boston	3.52½+20¢	3.52½+20¢	3.52½+20¢	3.52½+20¢	3.90+20¢	3.90+20¢	3.52½+20¢	3.45+20¢	2.80+10¢
Chicago	3.65+5¢	3.80+5¢	3.85+5¢	3.85+5¢	4.25+5¢	4.25+5¢	3.85+5¢	3.70+5¢	3.85+5¢
Cincinnati	3.575+10¢	3.575+10¢	3.575+10¢	3.575+10¢	3.575+10¢	3.80+10¢	3.80+10¢	3.80+10¢	3.80+10¢
Cleveland	3.86	3.86	3.86	3.86	4.11	4.11	3.86	3.735	3.735
Dallas	1.80/2.625	1.80/2.625	1.80/2.625	1.80/2.625	3.375	3.375	1.80/2.625	2.00	2.00
Denver	2.50	3.10	3.10	3.10	3.25	3.25	3.10	3.10	2.60
Detroit	3.63+39½¢	3.63+39½¢	3.63+39½¢	3.63+39½¢	3.63+39½¢	3.63+39½¢	3.63+39½¢	3.35+395¢	3.03+34¢
Kansas City	2.875	3.325	3.325	3.325	3.57	3.57	3.325	3.325	3.675
Los Angeles	4.11+20¢	4.11+20¢	4.11+20¢	4.21+20¢	4.21+20¢	4.21+20¢	4.21+20¢	3.33+20¢	3.29+10¢
Minneapolis	3.36	3.58	.....	3.60	3.82	4.08	3.38	3.25	3.15
New Orleans	3.42½+7½¢	3.42½+7½¢	3.42½+7½¢	3.42½+7½¢	3.42½+7½¢	3.42½+7½¢	3.42½+7½¢	2.72+7½¢	2.02½
New York	4.275+34¢	4.275+34¢	4.275+34¢	4.40+35¢	5.15+41¢	5.15+20¢	4.40+35¢	4.40+35¢	4.00+20¢
Philadelphia	3.63+10	3.63+20	3.775+20	3.90+20	4.345+20	4.345+20	3.765+20	3.51+20	2.55+10¢/2.60+15¢
Pittsburgh	3.72+20¢	3.72+20¢	3.72+20¢	3.72+20¢	3.92+20¢	3.92+20¢	3.92+20¢	3.43+20¢	2.60+20¢
St. Louis	4.00	4.00	4.00	4.00	4.00	4.00	4.00	3.45	3.45
San Francisco	4.01+35¢	4.01+35¢	4.01+35¢	4.14+35¢	4.31+35¢	4.31+35¢	4.21+35¢	3.48+35¢	3.475+10¢
Seattle	3.81+20¢	3.81+20¢	3.81+20¢	3.81+20¢	4.18+20¢	4.18+20¢	3.90+20¢	3.54+20¢	3.35+10¢
Montreal	1.95+4¢	2.18+5¢	2.18+5¢	2.18+5¢	2.45+5¢	2.45+5¢	2.18+5¢	2.05+5¢	2.05+5¢
Toronto	2.45+10¢	2.55+10¢	2.55+10¢	2.55+10¢	3.05+12¢	3.20+12¢	2.85+11¢	2.55+10¢	2.55+10¢

ENR Skilled Labor Average (Bricklayers, Carpenters, Iron Workers): $4.119, ENR Common Labor Average $2.765

Description of fringe benefits last appeared Sept. 22 1960. •A 1-2 drum. •R Revised

BUILDING BOARD & LATH AND INSULATION—DELIVERED TRUCKLOAD LOTS

	GYPSUM PLASTER BOARD tapered edge per Msq ft ½"	½"	GYPSUM BOARD LATH plain or perf per Msq ft ⅜" x 16" x 48"	GYPSUM SHEATHING tongue & groove per Msq ft ½" x 2' x 8'	FIBER BOARD SHEATHING asph impreg & coat per Msq ft ½" sq ed	½" T&G	FIBER BOARD INSULATION sq edge, paint per Msq ft 1"	MINERAL WOOL INSULATION loose, per 40-lb bag a	3" batts per M sf	GLASS FIBER INSULATION loose, per 40-lb bag a	3" batts per M sf	ALUMINUM FOIL 80# Kraft 1 side foil per roll of 250 s. f.	Expansible Blanket 2 layers foil per Msq ft
Atlanta	$82.50F	$52.50F	$40.00F	$62.50F	$72.00F	$127.00F	$75.00F	1.59z	$67.80F	$2.00	$80.00F	$4.77qi	
Baltimore	54.00	47.50	35.75	55.70	65.00	108.50	69.00	1.40F	67.50F	1.60F	47.00F	4.00F	$33.50F
Birmingham	63.00H	52.00H	47.77H	75.00H	67.50H	140.50H	83.50H	1.40	70.00	2.00	65.00	3.77gG	
Boston	60.00mH	50.00mH	35.00mH	55.00mH	65.00H	120.00H	79.00knH	1.40bH	75.00H	.....	75.00H	5.30zHS	53.50qH
Chicago	67.50	54.50	45.00	62.50	87.00	123.00	87.00	1.85	80.00	.....	63/65	5.25j	
Cincinnati	52.50wH	42.85wH	33.05wH	51.16wH	77.00wH	125.00wH	72.50wH	1.45wH	60.00wH	1.45wH	60.00wH	3.02jwJ	66.00wJ
Cleveland	62.00CF	58.50CF	41.50CF	65.00CF	80.00CF	129.00CF	80.00CF	1.35	75/80H	.....	67.00	14.00iqJ	55.00J
Dallas	56.25	46.85	42.50	56.25	68.75	118.00	68.75	2.00	70.00	1.75	70.67	5.00gAG	45.00
Denver	62.50H	51.50H	43.00H	67.00H	62.50H	103.50H	77.00	1.55b	65.00wb	2.00b	65.00a	5.25	48.65
Detroit	66.00K	56.00K	42.45K	66.00K	48.50DK	85.65DK	62.50DK	1.30b	52.00	1.85b	80.00	.....	.....
Kansas City	72.00H	62.00H	45.00H	.....	75.00H	122.00H	80.00H	1.40H	75.00H	1.80H	75.00H	3.60d	60.00
Los Angeles	Q 67.00F	60.50F	0.33xF	64.50F	75.00F	125.00F	80.00F	76.00BeF	83.00F	1.35e	64.00	4.65g	7.90V
Minneapolis	F 75.00F	65.00F	0.41xL	75.00F	95.00F	130.00F	78.00F	2.25wF	80.00F	2.10F	80.00F	4.25F	.....
Montreal	58.00M	49.30M	37/41.50M	53.00M	64.75M	.....	58.50M	1.50M	66.00M	1.50M	66.00M	9.00qM	58.00M
New Orleans	57.00H	52.00H	45.00H	60.00H	67.00H	140.00H	80.00H	3.00L	70.00*	.....	.....	.....	62.50U
New York	65.00H	55.00H	42.50H	60.00H	78.00	124.00	78.00	1.55b	68.50k	.....	.....	4.38iH	40.00eH
Philadelphia	H 52.00	45.00	36.50	52.50	65.00	115.00	65.00	1.20	50.00	1.40	50.00	2.99	83.50
Pittsburgh	74.00K	65.00K	40.00K	63.00K	60.00K	100.00K	60.00K	1.25eK	55.00K	1.25qK	55.00K	4.25iqK	38.50K
St. Louis	56.50-67.50HO	51-56.00HO	40.00HO	67.00HO	65-75HO	115/120HO	75/80.00HO	125/135	60-75HO	2.00PHO	74.00HO	4.39iqHO	.....
San Francisco	60.00F	49.00F	0.36xF	61.00F	70.00F	111.00F	69.00F	1.75F	66.50F	1.75F	66.50F	5.10	60.00F
Seattle	71.75K	59.50K	51.50K	70.00K	68.50K	125.00K	71.00K	1.25eK	58.00K	1.90*pK	51.00*fKh	4.25K	45.00EK
Toronto	49.50	37.25	46.50L	70.00	79.00T	.....	88.00T	1.85	60.50	.....	60.50	15.50e	46.00

•• F.o.b. warehouse. •a Semi thick. •b 30# bag. •c 3 layers of foil: $54.50. •d 40# kraft paper, 5 Msf, 100/500 rolls. •e 20# sq ft bag, 4" thick. •f Full trailer loads. •g 80# kraft paper backing 400 rolls or over. •h LCL. •i 40#. •j 80#. •k 2-in. •l 2". •m 8 to 10 ton quantities. •n Distributor's siding. •o Per Msf roll. •p 32# bag. •q 500 sf. •s 35# bag. •t 26# bag •u Flame proof $75. •v 5000 sf quantity. •w F.o.b. city. •x Sq. yd. •y 30# bag. •z Soun rock wool. •A 650 sf. •B ton. •C F.o.b. plant, freight allowed. •D CL. •E 10 Msf. •F less 2% disc. 10th. •G ½ of 1%, 10 days. •H 2% disc, 10 days. •J 1% disc, 10 days. •K less 2% for cash. •L 5% disc, 10th mo. •M fed. tax incl. •N 1% disc, 10 days. •O add 2% sales tax. •P 50 lb. bags, •Q add 4% sales tax. •R revised. •S 45 lb. •T less 2%, 30 days. •U lots of 2606 sq. ft. •V 250 sf roll.

MEXICO CITY WAGES & PRICES

WAGES, av per week, 8 hr day (pesos)a		Jan. '61
Common labor,	building (peons)	101.50
	heavy const (peons)	136.50
Skilled labor,	carpenters 1 cl	210.00
	bricklayers 1 cl	245.00
	struct. ironworkers	315.00

•a 6 days work-extra day's pay

MATERIALS PRICES, F.o.b. City (pesos)		Jan. '61
Struct. steel shapes, fob Monterrey		
I-beams, 3 x 3 x 4"	per metric ton	1942.10
Reinf. steel, corrugated rods, per ton		
⅜"-½" x 11 meters consolidada		1925.00
⅝"-1" x 11 meters		1800.00

		Jan. '61
Gravel, truckload, per cu meter		
Blue gravel		30.00
Cement, std. port. (Tolteca)	per metric ton	255.00
Lumber, 2" x 4" 1st class pine 20 ft.	per M sq. ft.	2700.00
2" x 4" 2nd class pine	per M sq. ft.	2300.00

MEASURES 50 MILES IN FIVE MINUTES!

Cubic Electrotape electronic surveying equipment measures distances from 250 feet to 100 miles in almost the twinkling of an eye. Electrotape accuracy, even under environmental extremes is 1 inch +1 part in 400,000.

PROVED IN USE

Here are two recent examples of Electrotape efficiency. A crew establishing microwave stations along a 1400-mile pipeline for Pacific Gas & Electric used Electrotape to complete the job in two weeks. San Diego County, California, which is larger than the State of Connecticut, is saving years by using Electrotape in an extensive county-wide surveying and aerial mapping program.

Two identical tripod-mounted Electrotape units are used to measure a given distance. As each unit can be operated by one man, surveying crew expenses are minimized. A radio transmitter and receiver, operating on radar frequencies, and ultra-precise phase-measuring equipment, form the heart of the system.

HOW IT WORKS

In simplest terms, Electrotape measures the time it takes for a radio wave to travel from one unit to the other and back again. Since the speed that radio waves travel is known, it is then easy to calculate the distance involved. An Electrotape operator requires no knowledge of electronics, and can learn the basic techniques in only 20 minutes. The equipment is lightweight and may be back-packed over rough terrain. A built-in communications link enables the Electrotape operators to converse, for maximum field efficiency.

Savings made possible by Electrotape can easily pay for equipment cost in less than 1 year. Write today for your free copy of a booklet on Electrotape, to Dpt. ENR-100, Industrial Division, Cubic Corp., San Diego 11, California.

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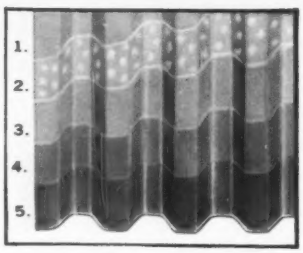
CORPORATION

Get two-way corrosion resistance plus greater

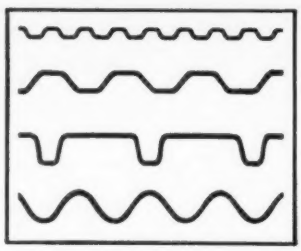
VIN-COR...new vinyl protected

Granco Vin-Cor is a new concept in protected metal —corrugated steel panels protected on both sides by a generous galvanized coating, plus a tough three-coat vinyl finish. *Permanent protection* against weathering and corrosive atmospheres. *Permanent color* proved by Weatherometer tests. Vin-Cor's durable vinyl surface requires no maintenance. Won't craze, chip or peel. The zinc coating provides important secondary galvanic protection when Vin-Cor is drilled or cut.

Granco Vin-Cor is made from tough-temper steel. Strong. You can specify lighter gages than ordinarily required or use fewer supports. Reduce costs. Vin-Cor is classified noncombustible by NFPA Std. No. 220.

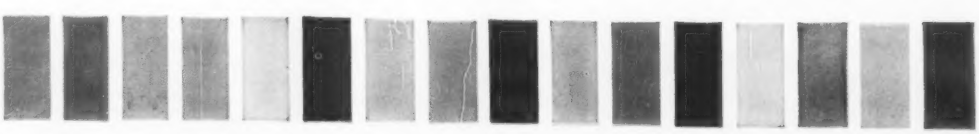


FOUR INDEPENDENT CORROSION-RESISTANT COATINGS
1. Steel • 2. Zinc • 3. Prime Coat
4. Vinyl Coat • 5. Vinyl Finish Coat



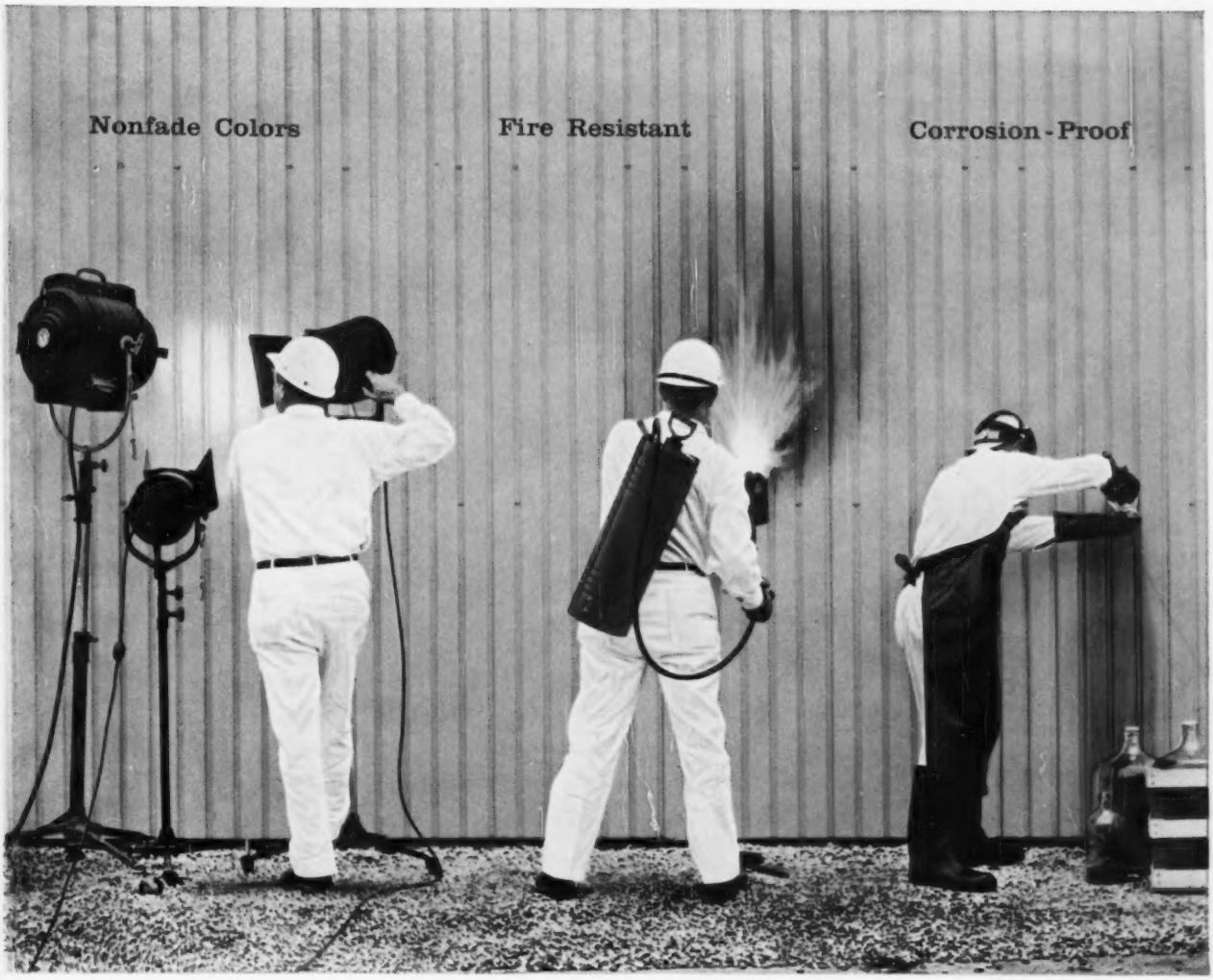
WIDE VARIETY OF PATTERNS AND GAGES IN ANY LENGTH TO 12′ 0″

Granco Vin-Cor is available in the widest variety of beautiful, nonfade colors ever offered in a protected metal. Furthermore, you can have a different color on opposite sides of the Vin-Cor panel!



strength, beauty and economy with...

galvanized steel panels



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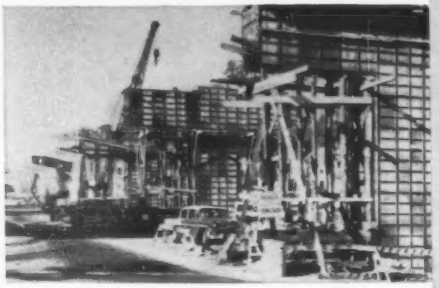

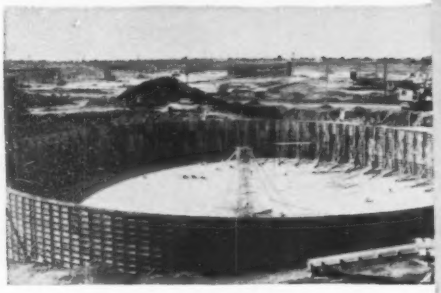

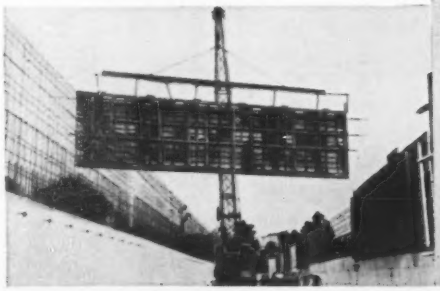

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LOS ANGELES SAN LEANDRO TORONTO

Bids Asked—Low Bidders—Contracts Awarded—

NEW ENGLAND

HEAVY CONSTRUCTION—BA

▲ **Mass., East Boston**—BA 2/24—Massachusetts Port Auth., 141 Milk St., Boston, MPA-1.009 HANGAR, Logan Airport. $3,000,000. Plans deposit $50. W. Chester Browne & Assoc., 122 Arlington St., Boston, Mass., archts. Joseph A. Rasys, 15 Wendover St., Dorchester, Mass., engr. Trans-World Airlines, Lessee. CD 2/8.

▲ **Conn., Waterbury** — BA 2/14 — St. Mary's Hospital Corp., 56 Franklin St., HOSPITAL ADDN., Scovill St., $5,000,000. Polak & Sullivan, 1397 Chapel St., New Haven, archt. Arth. G. Beaulieu Assocs., 2348 Whitney Ave., Hamden, consult. engrs. Hubbard, Lawless & Blakeley, 110 Whitney Ave., New Haven, mech. engrs. Frank C. DeFelice, 34 Auburn St., New Haven, electrical engrs. CD 11/30/60.

▲ **Conn., Wilton**—BA 2/16—Town, High School Bldg. Com., Town Hall, High SCHOOL, $2,000,000. Plans deposit $25. Caudill, Rowlett & Scott, Pedersen & Tilney, 155 Whitney Ave., New Haven, Conn., archts. CD 7/6.

▲ **Mass., Cambridge**—BA 2/20—Massachusetts Institute of Technology, 77 Massachusetts Ave., (selected list bidders), 20 story post tensioned concrete EARTH SCIENCE. $5,000,000. I. M. Pei & Assoc., 385 Madison Ave., New York, N. Y., archts. Severud, Elstad, Krueger Assoc., 415 Lexington Ave., New York, N. Y., strutcural engrs. CD 1/14.

HEAVY CONSTRUCTION—LB & CA

▲ **CONNECTICUT**—State Hy. Comr., 170 Douglas St., Hartford, Bids opened Jan. 23, ROADS,
Angelo Tomasso, Inc., Warren St., New Britain, Conn., LB **$5,159,762**, (13 bidders), 22.109 lin. ft. reinforced concrete pavement on Interstate Rte. 1-84, incl. 11 bridge structures and 2 box culverts, Fed. Aid Proj. EI-EIG-84-3(23)42, Southington. CD 1/5.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ **Pa., Coatesville**—BA 2/16—Coatesville Sewage Plant Authority, SEWAGE DISPOSAL PLANT addns. $1,-200,000. Plans deposit $50. Albright & Friel Inc, 3 Penn Center Plaza, Phila, Pa., engr. CD 9/11/58.

▲ **N. J., Secaucus**—BA 2/17—Town, Town Hall, SEWERAGE SYS. $3,000,000. Homer O. Smith, Paterson Plank Rd., Secaucus, N. J., engr. Bids 12/19 rejected. CD 12/28 under LB.

HEAVY CONSTRUCTION—LB & CA

▲ **P. J. Carlin Constr. Co.**, 41-17 Crescent St., Long Island City, N. Y., and **Thomas Crimmins Contracting Co.**, 624 Madison Ave., New York, N. Y., LB **$12,-368,979**, (12 bidders), Contr. Q 99-660, SPORTS STADIUM, Flushing Meadow Park, Grand Central Parkway, 126 St., Northern Blvd. and Roosevelt Ave., Queens Boro, FLUSHING, N. Y. Comr. Parks, Arsenal Bldg., Central Park, E. 63 St. and 5 Ave., New York 21, N. Y. BA 1/24. CD 12/27;
Nager Electrical Co., Inc., 428 Broadway, Brooklyn, N. Y., LB **$1,798,000**, (13 bidders), Contr. Q 99-760 electrical work, Sports Stadium, Queens Boro (Flushing, N. Y.);
Alexander C. Patterson & Sons, 200 W. 72 St., New York, N. Y., LB **$370,000**, (7 bidders), Contr. Q 99-980 heating and ventilating Sports Stadium, Queens Boro (Flushing, N. Y.);
Astrove Plumbing & Heating Co., 36-14 32 St., Long Island City, N. Y., LB **$621,800**, (9 bidders), Contr. Q 99-960 plumbing, Sports Stadium, Queens Boro (Flushing, N. Y.);
Otis Elevator Co., 260 11 Ave., New York, N. Y., LB **$1,369,000**, (2 bidders), Contr. Q 99-1060 elevators and moving stairs, Sports Stadium, Queens Boro (Flushing, N. Y.).

▲ **Johnson, Drake & Piper, Inc.**, 86 Trinity Pl., New York, N. Y., CA **$2,570,993**, Contr. 456 INTAKE WORKS, West Delaware Tunnel Cannonsville, Tomokins, Delaware Co., NEW YORK, N. Y. Bd. Water Supply, 13 Fl., 120 Wall St., New York 5, N. Y. BA 1/10. Awarded 1/24. CD 1/12 under LB.;
Rosoff Bros. Inc., 369 Lexington Ave., New York 17, N. Y. and **Foster-Newman Contg. Co.**, 3622 13 Ave., Brooklyn 18, N. Y., CA **$2,091,980**, Contr. 457, OUTLET WORKS, West Delaware Tunnel, Grahamsville, Neversink, Sullivan Co. (New York, N. Y.).

BUILDINGS—LB & CA

▲ **L. F. Driscoll**, 32 W. Coulter St., Phila., Pa., LB **$3,569,000**, MEDICAL RESEARCH BLDG., PHILA., PA. Temple University Hospital, 3401 N. Broad St., Phila., Pa. Nolen & Swinburne, 226 S. 16th St., Phila., Pa., archts. Severud-Elstad-Krueger, Assocs., 415 Lexington Ave., New York, N. Y., engrs. Bids Dec. 22. CD 11/30.

▲ **John A. Volpe Constr. Co.**, 1507 M St. N.W., Wash., D. C., LB Est. **$6,000,000**, 8 story rein.-con. frame, precast HOSPITAL, incl. 2 story boiler plant, SILVER SPRING, MD. Holy Cross Hospital, Sisters of the Holy Cross, Eastern Ave. and Bunker Hill Rd. N.E., Wash., D. C. BA 1/17. CD 1/11.

▲ **Gunnell Construction Co. Inc.**, Tower Bldg., Wash., D. C., LB **$2,058,500**, Bertie Backus Junior High SCHOOL, South Dakota Ave., & Hamilton St., NE, WASH., D. C., D. C. Govt. Dpt. of Buildings & Grounds, 499 Pennsylvania Ave. N.W., Wash., D. C. Mills, Petticord & Mills, 3308 14th St., NW, Wash., D. C., archts. Bids Jan. 19. CD 12/15.

SOUTH

HEAVY CONSTRUCTION—BA

▲ **S. C., Charleston**—BA 2/14—City, City Hall, TRUNK SEWERS, pumping stations and equipment, $2,000,000. Plans deposit $10. Extended date. Cummings & McCrady, Exchange St., Charleston, engrs. CD 1/17/61.

▲ **Fla. Deland**—BA 2/28—Volusia Co. Bd. Pub. Instruction 230 North Stone St. Campbell Street SCHOOL, Daytona Beach $1,600,000. W. R. Gomon & Assocs., Box 1671, Daytona Beach, Fla., archts. CD 1/24.

▲† **Kentucky and Indiana**—BA 3/14—U. S. Eng., P. O. Box 59, Louisville 1, Ky., DAM, McAlpine Locks and Dam incl. 2 gated structures at separate locations on alignment of existing dam, 3,000 lin. ft. concreting Boule Weir, 650 lin. ft. Chanoine Pass to form fixed Weir, etc. CIVENG 15-029-61-33. Over $10,000,000. Plans deposit $10. CD 9/20/60.

BUILDINGS—BA

▲ **Ky., Richmond**—BA 2/14—Commonwealth of Ky., Div. Purchases, 327 Capitol Annex, Office Bldg., Frankfort, 5 story 95x500 brick and rein.-conc. 400 bed men's DORMITORY, Eastern State College. $1,480,000. Plans deposit $50. Brock & Johnson, 159 Barr St., Lexington, Ky., archts. Staggs & Fisher, 508 E. Main St., Lexington, Ky., engrs. CD 12/27.

▲ **Ky., Richmond** — BA 2/17 — Commonwealth of Ky., Div. Purchases, 327 Capitol Annex Office Bldg., Frankfort, 4 story, bsmnt., 79,000 sq. ft. brick Women's DORMITORY, Eastern State College. $1,000,000. Plans deposit $50 John Gillig & Assoc., 180 Walnut St., Lexington, Ky., archts. E. R. Ronald & Assoc., 554 S. 3 St., Louisville 2, Ky., engrs.

HEAVY CONSTRUCTION—LB & CA

▲† **Burkholder & Burkholder Co.**, 116 W. Piccadilly St., Winchester, Va., LB **$2,705,685**, (9 bidders) ACCESS HIGHWAY to Dulles International Airport, two traffic interchanges, CHANTILLY, VA., Federal Aviation Agency, 16th & Constitution Ave., NW, Wash., D. C., BA 1/24/61. CD 1/20.

▲ **Howard Constr. Co.**, 2881 Immanuel Rd., Greensboro, N. C. and **Blythe Bros. Co.**, 2911 N. Graham St., Charlotte, N. C. CA **$1,308,044**, sanitary SEWER outfall lines, HIGH POINT, N. C., City, City Hall, High Point, N. C. BA 1/11. CD 1/18, under LB.

▲ **Wright Contracting Co.**, P. O. Drawer 1580, Columbus, Ga., LB **$1,917,810**, est. $2,000,000 (9 bidders) 3,300 ft. BRIDGE and approaches Techwood Dr. Viaduct in Atlanta Expressway, Nelson St. N to Marietta St., ATLANTA, GA., City, Mitchell St., SW, Atlanta, Ga., Roberts & Company Assocs., 96 Poplar St., NW, Atlanta, Ga., engrs., BA 1/23/61. CD 1/4.

▲ **Malan Constr. Co., 2 Park Ave., New York, N. Y.**, LB **$2,660,000** (11 bidders) SEWAGE IMPRVT., Contr. 9, LEXINGTON, KY. City, Municipal Bldg., Lexington, Ky. BA 1/24 CD 1/10.

BUILDINGS—LB & CA

▲ **George W. Kane**, 111 Corcoran St. Bldg., Durham, N. C., CA **$1,060,000**, DEPARTMENT STORE, DURHAM, N. C. Wright Real Estate Co., 106 W. Mangum Ave., Durham, N. C. Thalhimer's-Ellis-Stone Dept. Store, Main St., Durham, N. C., lessee. BA 12/19. CD 11/28.

▲ **Fenix & Scisson, Inc.**, 5 St., Tulsa, Okla., CA Total Cost **$1,000,000**, TUNNELS and CAVERNS, for underground liquid gas storage south of Ohio River and River Rd., 40-acre site, COVINGTON, KY. Union Light, Heat & Power Co., c/o Cincinnati Gas & Electric Co., 4th and Main Sts., Cincinnati, O. CD 1/23.
Moran Brothers, Inc., Oil & Gas Bldg., Wichita Falls, Tex., CA drilling, main shaft and ventilation shaft, for underground liquid gas storage (Covington, Ky.).

▲ **Algernon Blair, Inc.**, 1st National Bank Bldg., Montgomery, Ala. LB **$1,058,000**, (12 bidders), Women's RESIDENCE HALL, 5 floors, 2 wings, TUSCALOOSA, ALA. University of Alabama, P.O. Box 1957, Tuscaloosa, Ala., Lawrence Whitten, Brown-Marx Bldg., Birmingham, Ala., archt., BA 1/17/61. CD 1/3.

▲ **T. C. Brittain Co.**, P.O. Drawer B, Decatur, Ga., CA **$1,345,295**, ADMINISTRATIVE-ACTIVITIES BLDG., ATLANTA, GA. The Westminster Schools, 1414 W. Paces Ferry Rd. N.W., Atlanta, Ga. Francis M. Daves, 57 8th St. N.E., Atlanta, Ga., archt. CD 11/9, under LB.

▲ **Southeastern Constr. Co.**, Box 1197, Jackson, Miss., CA **$1,039,000**, est. $1,750,000, 3 story, steel frame, brick and tile, etc., air-conditioned BANK addn., parking garage and office, JACKSON, MISS. First National Bank, Capitol and N. West St., Jackson, Miss. James T. Canizaro, 1st National Bank Bldg., Jackson, Miss., archt.
South Central Heating & Plumbing Co., Inc., P.O. Box 4627 Fondren Sta., Jackson, Miss., CA **$498,000**, mechanical for BANK addn., etc. (Jackson, Miss.).

▲ **W. H. Belanga Constr. Co.**, 619 W. 25th St., Norfolk, Va., CA **$1,431,811**, four 84-bed ACUTE CONVALESCENT BLDGS., Eastern State Hospital, WILLIAMSBURG, VA. Commonwealth of Virginia, State Hospital Board, 9 N. 12th St., Richmond, Va. BA 12/29/60. CA 1/24/61. CD 1/4/61, under LB.

MIDDLE WEST

BUILDINGS—BA

Wis., Milwaukee—BA 2/8—City, City Hall, 2 story, 67 x 203 ft., rein.-con., 88-car PARKING STRUCTURE, N. 22 and Kilbourn Sts. $130,000. Plans deposit $10. CD 2/4.

▲ **O., Oxford**—BA 2/21—Dpt. P. Wks., State Depts. Bldg., Columbus, Zone 15, WOMEN'S HALL NO. 5 (South), Miami University. $1,000,000. Plans deposit $20. Cellarius & Hilmer, 613 Gas & Electric Bldg., Cincinnati, archts. Fosdick & Hilmer, Fifth-Third Bldg., Cincinnati, engrs. CD 12/15.

▲ **R. B. Potashnick**, Box 423 and Cape Constr. Co., Cape Girardeau, Mo., CA est. **$8,400,000**, 93 mi. natural GAS TRANSMISSION LINE from near Johnsonville, Ill. to St. Louis, Mo., incl. 18 in. pipe and two 12-in. river crossings, Mississippi River ILLINOIS AND MISSOURI, Mississippi River Transmission Co., 407 N. 8th St., St. Louis 1, Mo.

BUILDINGS—LB & CA

▲ **George W. Timmons**, 7211 New Germany Rd., Dayton, O., LB **$1,097,359**, (7 bidders) LAUNDRY bldg. No. 25, addns., steam distribution system extension, Veterans Admin. Hospital CHILLICOTHE, O. Veterans Admin., Munitions Bldg., Wash., D. C. BA 1/24. CD 12/12.

▲ **Metropolitan Park Estates**, 18009 Holland Rd., Berea O., Owner builds **$7,000,000**, 400 HOMES, BEDFORD HEIGHTS, O. CD 2/17.

▲ **Knowlton Constr. Co.**, 1133 W. Columbus St., Bellefontaine, O., CA **$1,122,800**, VETERINARY CLINICAL UNIT, Ohio State University, COLUMBUS, O. Ohio Dpt. P. Wks., State Dpts. Bldg., Columbus, Zone 15, O. Bellman, Gillett & Richards, 1600 Madison St., Toledo, O., archts. Bids Dec. 28. CD 10/14.

▲ **Tocomo Corp.**, 965 E. Broad St., Columbus, O. Owner builds **$3,000,000** 12 story APARTMENT, 1100 E. Broad St., COLUMBUS, O. Tibbals-Crumley-Musson, 965 E. Broad St., Columbus, O., archts. CD 11/22.

▲ **Turner Constr. Co.**, Gwynne Bldg., Cincinnati, O. CA est. **$1,500,000**, 3 story, bsmnt, NURSING HOME, CINCINNATI, O. Methodist Home for Aged, 5343 Hamilton Ave., Cincinnati, O. CA 1/18. CD 2/24/60.

A. B. Cochran & Son Inc., 2425 E. 46th St., Indianapolis, Ind., CA **$511,300**, GRADE SCHOOL No. 98, Dubarry Rd., INDIANAPOLIS, IND. Bd. School Comrs., 150 N. Meridian St., Indianapolis, Ind. BA 12/30. CD 12/15.

▲ **Midland Constr. Co.**, Rte. 45, Harrisburg, Ill., LB $1,007,000, (5 bidders) Phase II, FAMILY HOUSING, CARBONDALE, ILL. Southern Illinois University, Carbondale, Ill. Glen Frazier & Assocs., 104 University Ave., Urbana, Ill., archts. CD 4/9/45.

▲ **Gust K. Newberg Constr. Co.**, 2040 N. Ashland Ave., Chicago, Ill., LB **$10,000,000**, 27 story, 119x145 and 119x145 ft., rein.-con. APARTMENTS, swimming pool, sea wall, Sheridan Rd. and Devon Ave., CHICAGO, ILL. Bee-Gee Builders, 5927 W. Addison St., Chicago, Ill. BA 1/6. CD 12/15.

▲ **Joseph T. Carp, Inc.**, 5640 Northwest Hy., Chicago, Ill., CA **$1,000,000**, 50,000 sq. ft. OFFICE, PARK RIDGE, ILL. All American Life & Casualty Co., 505 Park Pl., Park Ridge, Ill. Graham Anderson Probst & White, 201 N. Wells St., Chicago 6, Ill., archts. CD 12/3/59.

▲ **Thomas D. McCloskey**, 1620 N. Thompson St., Phila., Pa., CA **$3,900,000** build-lease POST OFFICE facility, GRAND RAPIDS, MICH. U. S. Post Office Dpt., 12 and Pennsylvania Ave. N. W., Wash., D. C. BA 1/13. CD 1/24 under LB under Public Buildings.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲ **Oklahoma**—BA 2/16—U. S. Eng., Box 61, Tulsa, Zone 2, RELOCATING Oklahoma State Hy. No. 51, surf., turfing, Buckeye Creek, Cottonwood Creek, Salt Creek, Sections 1, 2, 3, Keystone Reservoir, CIVENG-34-066-61-54, **$2,000,000**. CD 1/11.

BUILDINGS—BA

▲ **Mo., Ferguson (St. Louis 35 P.O.)**—BA 2/8—Ferguson-Florissant School Dist. R-2, Bd. Educ., 655 January Ave., Ferguson 35, 2 and 3 story steel, concrete McCluer JUNIOR HIGH SCHOOL addn., 1 story masonry Gymnasium, U.S. 66 and Florissant Rd., Florissant, Mo. $2,000,000. Plans deposit $50. Charles W. Lorenz, 700 N. Ballas Rd., Kirkwood 22, Mo., archt. CD 2/25.

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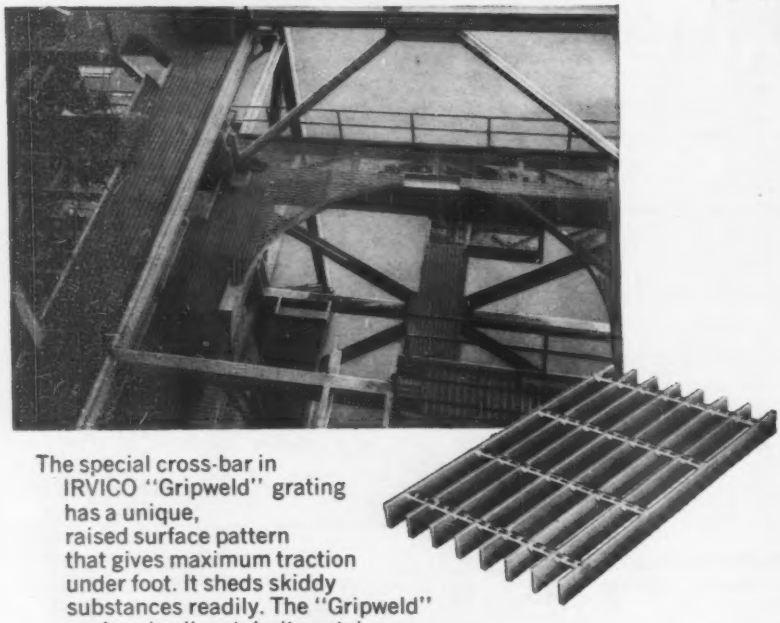

The special cross-bar in IRVICO "Gripweld" grating has a unique, raised surface pattern that gives maximum traction under foot. It sheds skiddy substances readily. The "Gripweld" surface is all metal—it contains no sandy or gritty material that may become dangerously packed with oil or grease.

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▲ **Tex., Dallas**—BA 2/7—Dallas Ind. School Dist., 3 story, 64,000 sq. ft. fl. sp. rein.-con. frame, brick, South Oak Cliff High SCHOOL ADDN., 3601 S. Marsalis, $1,015,000. Plans deposit $25. Thomas, Jameson & Merrill, 820 N. Harwood, Dallas, archts. CD 8/25.

▲ **Kan., Lawrence**—BA 2/15—State Dpt. Administration Topeka, Kan., (CH Kans 56-D) Women's DORMITORY. $1,875,000. CD 11/11/59.

HEAVY CONSTRUCTION—LB & CA

▲† **Peter Kiewit Sons Co.,** 2700 George Washington Blvd., Wichita, Kan., CA **$1,068,930,** est. $1,222,467, (8 bidders), rehabilitation PAVEMENT, Hutchinson Naval Air Station, Air National Guard, ENG-23-028-61-51, HUTCHISON, KAN. U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo. Bids Jan. 10, awarded Jan. 17.

BUILDINGS—LB & CA

▲ **Lloyd E. Clarke Inc.,** 6581 University St., Des Moines, Iowa, Owner builds **$6,500,000,** HOMES, adjining Village Shopping Center, DAVENPORT, IOWA.

▲ **Shepherd Constr. Co.,** 1015 Plainfield Rd., Joliet, Ill., CA Est. **$3,000,000,** 175,000 sq. ft. Fairway SHOPPING CENTER, U. S. Hy. 34 and 61, BURLINGTON, IOWA. Percy Wilson Investment Co., 134 N. LaSalle St., Chicago, Ill. CD 9/15.

▲ **Foley Bros., Inc.,** 900 New York Bldg., St. Paul, Minn., CA **$2,000,000,** middle-income housing, (First Phase), thirteen 3-story APARTMENTS, Fuller Rd. and Louis Marion Parkway, ST. PAUL, MINN. National Redevelopment Corp., c/o Richard Keller, archt., Superior Bldg., Cleveland, O.

▲ **Tellepsen Constr. Co.,** 1710 Telephone Rd., Houston, Tex., CA **$3,750,000,** udex PLANT, mfg. oxylenes, benzine, toluene, PASADENA, TEX. Crown Central Petroleum Corp., Houston Ship Channel, Houston, Tex. CD 4/9/51.

▲ **Suburban Homes Co.,** 730 Little York Rd., Houston, Tex., Owner builds **$3,200,000,** 290 DWELLINGS, HOUSTON, TEX.

▲ **E. I. duPont de Nemours & Co.,** duPont & Nemours Bldg., Wilmington, Del. Owner builds **$5,500,000,** Methanol Production Sabine River PLANT, ORANGE, TEX. CD 6/18/52.

▲ **Builders Constr. Co.,** Republic Bldg., Oklahoma City 2, Okla., CA **$1,187,652** est. $1,250,000 (15 bidders) Herbert Hoover JUNIOR HIGH SCHOOL, NW 115th and Greystone Sts., OKLAHOMA CITY, OKLA. Bd. Educ., 900 N. Klein St., Oklahoma City, Okla. Bids Jan. 19. CD 1/11.

▲ **Jacobs Engineering Co.,** 744 E. Green Pastures, Pasadena, Calif., CA est. **$3,000,000,** potash PLANT ADDN., CARLSBAD, N. M. Southwest Potash Corp., Div. American Metal Climax, Inc., Carlsbad, N. M.

FAR WEST

HEAVY CONSTRUCTION—BA

▲ **Calif., Los Angeles**—BA 2/24—Los Angeles County Flood Control Dist., 2250 Alcazar St., Proj. 404, Central Arcadia STORM DRAIN; Proj. 405, South Arcadia STORM DRAIN., Arcadia. **$1,250,000.** Plans deposit $2.60. CD 11/10/58.

▲† **California**—BA 2/28—U. S. Eng., 751 S. Figueroa St., Los Angeles, Santa Maria Valley LEVEES and channel imprvt., Part 3, Santa Maria River, CIVENG-04-353-61-14. $2,000,000. CD 9/20.

▲ **CALIFORNIA**—BA 3/9—State Div. Hys., 120 S. Spring St., Los Angeles, ROADS,
Los Angeles Co.—grading, paving 1.1 mi. eight lane freeway, San Diego Freeway between Artesia Blvd. in Torrance and 0.3 mi. west of Hawthorne Blvd. in Lawndale. $3,400,000. CD 10/27/58.

BUILDINGS—BA

▲ **Wash., Seattle**—BA 2/15—City, County-City Bldg., 140 x 220 ft., rein.-con. EXHIBIT-BANQUET HALL, rein.-con. THEATRE, **$2,000,000.** Plans deposit $150. Kirk, Wallace, McKinley & Assocs., 2000 Fairview Ave. N., archts. CD 10/24/58.

▲ **Wash., Fort Lewis**—BA 2/16—U. S. Housing & Home Finance Agency, Federal Office Bldg., Seattle Zone 4, 4,400 sq. ft. frame ELEMENTARY SCHOOL addn. Plans deposit $15. Mallis & DeHart, Lyon Bldg., Seattle, Zone 4, archts.

▲† **Calif., Twenty-nine Palms**—BA 2/21—11th Naval Dist. P. Wks., 1220 Pacific Hy., San Diego 1, convert Wherry Housing to PUBLIC QUARTERS, Spec. 34247. $100,000-$2,500,000. CD 9/28/59.

▲ **Utah, Salt Lake City**—BA 3/15—Granite School Dist., 340 E. 3545 South, 220,000 sq. ft. Skyline HIGH SCHOOL. $1,500,000-$2,000,000. Dean L. Gustauson Assocs., 15 N. West Temple, Salt Lake City, Utah, archts. CD 5/17.

HEAVY CONSTRUCTION—LB & CA

▲ **UTAH**—State Rd. Comn., State Capitol, Salt Lake City, Zone 14, ROADS,
V. C. Mendenhall Constr. Co., Box 519, Cedar City, Utah, CA **$1,184,419,** 5.3 mi. Interstate Hy. 15 and 3 concrete T-beam structures Anderson Jct. to Leeds, Washington Co. Bids Nov. 1, awarded Nov. 2. CD 11/9, under LB.

▲† **Westinghouse Electric Corp.,** 55 W. 5 Ave., Denver, Colo., CA **$1,477,516,** generators for Flaming Gorge Power Plant, Flaming Gorge Unit, Utah-Wyoming, Green Div., Colorado River Storage Proj. Inv. No. DS 5433, UTAH and WYOMING. Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 25, Colo. Bids Dec. 14. CD 12/21, under LB.

▲† **Gustav-Hirsch Organization Inc.**, 1347 W. 5 Ave., Columbus, O., CA **$1,275,592**, installation, rehabilitation and modernization COMMUNICATIONS and ELECTRONIC SYS. and facilities, IFB 04-606-61-207B. ELMENDORF AIR FORCE BASE, ALASKA. Contract & Purchasing Dpt., McClellan Air Force Base, Sacramento, Calif. BA 12/27. CD 12/16.

▲† **Western Contracting Co.**, 400 Benson Bldg., Sioux City, Iowa, LB **$5,170,000**, est. $6,562,332, (11 bidders), RUNWAY at Whidbey Island Naval Air Station, Spec. 28262/59 WHIDBEY ISLAND, WASH. Dist. P. Wks. Office, Rm. 107 B, Bldg. 250, US Naval Station Seattle 99, Wash. BA 1/24. CD 12/7.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, ROADS,

Healy Constr. Co. and C, K, F-M, 3911 Pacific Hy., San Diego, Calif., CA **$12,625,800** grading, paving and 16 structures 6 mi. 8 lane freeway, Golden State Freeway between Osborne St. and San Fernando Rd.; grading and structure work for future San Diego Freeway, Los Angeles Co. BA 1/5 CD 1/10 under LB.

▲ **Associated Construction & Engineers Co.**, 4225 W. Commonwealth Ave., Fullerton, Calif., CA **$1,174,800**, 3 tilt-up concrete WAREHOUSES, FULLERTON, CALIF. Hunt Foods Co., 200 Commonwealth Ave., Fullerton, Calif. John Fortune, 816 W. 5 St., Los Angeles, Calif., archt.

Clyde W. Wood & Sons, Inc., 6900 Tujunga Ave., North Hollywood, Calif., CA **$846,647** Proj. 44, Beverly Glen Blvd. STORM DRAIN, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. BA 1/6 CA 1/17 CD 1/13 under LB.

▲ **Weeshof Constr. Co.**, Globe Constr. Co. and B & P Trucking Co., 902 S. Santa Fe Ave., Los Angeles, Calif., LB **$1,181,510** (7 bidders) Proj. 481 Echo Park STORM DRAIN; Proj. 491 Beachwood Dr. storm drain, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist. 2,250 Alcazar St., Los Angeles, Calif. BA 1/20 CD 1/5.

▲ **William Simpson Constr. Co.**, 2401 Beverly Blvd., Los Angeles, Calif., CA **$2,500,000**, 12 story steel, frame and conc. OFFICE and garage, 1100 Glendon Ave., LOS ANGELES, CALIF. Harrison-Harrison Inc., 1145 Glendon Ave., Los Angeles, Calif. Thormin Haynes & Assoc., 672 S. La Fayette Park Pl., Los Angeles, Calif., archts.

▲ **Haas & Haynie**, 8913 Olympic Blvd., Beverly Hills, Calif., CA **$1,465,000** steel test LABORATORY, Ford Rd., NEWPORT BEACH, CALIF. Ford Motor Co., 3000 Schaefer St., Dearborn, Mich.

▲ **Secrest & Fish Inc.**, 1909 W. Whittier Blvd., Whittier, Calif., LB **$1,989,619** (11 bidders) Women's PHYSICAL EDUCATION, Campus Center Bldg., Pasadena City College, PASADENA, CALIF. Pasadena Bd. Educ., 351 S. Hudson Ave., Pasadena, Calif. Allison & Rible, 500 S. Virgil Ave., Los Angeles, Calif., archts. BA 1/17 CD 7/9/58.

▲ **Berry Constr. Co.**, 143 S. Granite St., Ontario, Calif., CA **$1,632,155** Northside HIGH SCHOOL, POMONA. Pomona Unif. School Dist., 504 N. Park Ave., Pomono, Calif. BA 12/15 CA 1/17 CD 12/28 under LB.

▲ **Louis C. Dunn, Inc.**, 3101 Wilshire Blvd., Los Angeles, Calif., LB **$4,118,900**, (12 bidders), PASSENGER CARGO TERMINAL at Berth 93-A and 93-B, Los Angeles Harbor, San Pedro, LOS ANGELES, CALIF. Los Angeles Harbor Dpt., City Hall, Los Angeles, Calif. Bids Jan. 17. CD 12/16.

▲ **Drogin Constr. Co.**, 6610 El Cajon Blvd., San Diego 15, Calif., CA est. **$1,339,675**, 75 RESIDENCES, Pacifica Unit No. 1, SAN DIEGO, CALIF. Ardee Builders, 6610 El Cajon Blvd., San Diego 15, Calif.

▲ **Riha Constr. Co.**, 8150 Center St., La Mesa, Calif., CA **$1,322,000**, Taft JUNIOR HIGH SCHOOL, Mission Village, SAN DIEGO, CALIF. San Diego Unif. School Dist., 4100 Normal Blvd., San Diego 3, Calif. Bids Jan. 17, awarded Jan. 18. CD 1/20, under LB.

▲ **Stolte, Inc. and Lee Stephens**, 8451 San Leandro St., Oakland, Calif., CA **$2,206,944** El Dorado and Center St. OVERPASSES, STOCKTON, CALIF. City, City Hall, Stockton, Calif. BA 12/12 CD 12/29 under LB.

BUILDINGS—LB & CA

▲ **Kenson Constr. Co., Ltd.**, 18 Rideau St., Ottawa, Ont. Owner builds **$3,000,000**, 133 x 224 ft., 110 ft. high, concrete, concrete precast, stone-face, steel superstructure, air-conditioned APARTMENT, OTTAWA, ONT. CD 8/2.

▲ **T. W. Y. Constr. Ltd.**, 420 O'Connor St., Ottawa, Ont., Owner builds **$5,000,000**, HOUSING sub-division, Hy. 17, Brittania Bay OTTAWA, ONT.

▲ **Lajeunesse Holdings Inc.**, 9559 Lejeunesse Blvd., Montreal, Que., Owner Builds, **$3,000,000**, twelve rein.-con. wooden framing, stone Jardins Fleury APARTMENTS, Fleury St., MONTREAL, QUE. Morris Melamed, 4147 Sherbrooke St. W., Montreal, Que., archt. Michael Fish., 4147 Sherbrooke St. W., Montreal, Que., assoc. archt.

CANADA

HEAVY CONSTRUCTION—BA

▲ **British Columbia**—BA 3/15—Dpt. Fisheries, Govt. of British Columbia, Parliament Bldgs., Victoria, earth-fill dam, concrete spillway weir, gate house, tunnel, penstocks, valve house for SALMON DEVELOPMENT PROJECT Big Qualicum, River, Qualicum, Vancouver Island, $1,000,000. Plans deposit $100.

BUILDINGS—BA

▲ **Ont., Toronto**—BA 2/8—International Business Machines Co., Ltd., Don Mills Rd., Don Mills, 9 story, 64,000 sq. ft., steel, glass, aluminum, brick OFFICE, King St. E., $1,500,000. Clare G. MacLean, 534A Lawrence Ave. W., Toronto, archts. Shepherd & Powell Ltd., 1365 Weston Rd., Toronto, engrs. CD 11/9.

HEAVY CONSTRUCTION—LB & CA

▲ **Bedford Constr. Co., Ltd.**, Rexdale, Ont., LB **$8,297,950** (8 bidders), EARTH EMBANKMENT, part of South Saskatchewan River Dam (contract 13), Hillspring, ALBERTA. Prairie Farm Rehabilitation Admin., Motherwell Bldg., Regina, Sask. Bids Jan. 18. CD 12/16.

▲ **T. C. Gorman (N.S.) Ltd.**, 441 Rainnie Dr., Halifax, N. S., LB **$2,097,829**, HARBOR Imprvs., North Shore, ST. JOHNS, NEWFOUNDLAND. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. Bids Jan. 18. CD 1/13.

▲ **SASKATCHEWAN**—Dpt. Hys. & Transportation, Parliament Bldgs., Regina (ROAD),

Beattie Ramsay Constr. Co., Ltd., Victoria & McDonald Sts., Regina, Sask., CA **$1,073,110**, paving Section No. 11 Hy. 19.6 mi. from Regina to Lumsden. BA 12/20. CA 1/19. CD 1/18, under LB.

▲ **Bedford Constr. Co.**, Rexdale, Ont., LB **$8,297,950**, (8 bidders) earth embankment, part of South Saskatchewan River Dam Proj., Contract No. 13, SASKATCHEWAN Prairie Farm Rehabilitation Admin., Motherwell Bldg., Regina, Sask. BA 1/18. CD 12/28.

▲ **Canada Cement Co., Ltd.**, Phillips Sq., Montreal, Que. and Inland Cement Co., Ltd., Regina, Sask., LB **$1,031,250**, (2 bidders), supply cement for down-stream tunnels for South Saskatchewan River Dam Proj. CD 12/31/52.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

▲ **Ethiopia**—BA 2/6—Minister P. Wks. & Communications, Imperial Govt. Ethiopia and Ethiopian Airlines, Addis Ababa, JET RUNWAYS, terminal bldgs., lighting Addis Ababa and Asmara International Airports, imprv. airports, Dire Dawa and Jimma and 20 other sites, new airport at Bahar Dar. Extended date. Amman & Whitney-Husted, 111 8 Ave., New York, N. Y., U.S.A., archts.-engrs. CD 12/2.

BUILDINGS—LB & CA

▲ **Kuljian Corp.**, 1200 N. Broad St., Phila. 21, Pa., U.S.A., CA **$55,000,000**, design and construct 1st unit, 300,000 kw. THERMAL POWER STATION near Bendel on Bhagirathi Hooghly River, INDIA. Govt. West Bengal, Calcutta, India.

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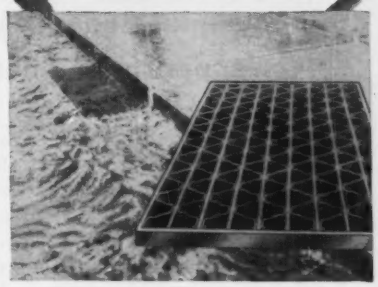

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With open steel mesh draingrates, larger clear openings reduce the likelihood of flooded highways considerably. Irving "Dryway" Draingrates are 75% open for greater drainage and are made of steel bars on edge, not subject to cracking.

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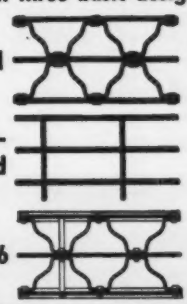

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CONVEYOR SYSTEMS 1600 MI. APART SPEED ORE SHIPMENTS TO U.S.

Specially designed Barber-Greene system utilizing unique hinged arch-type supports mechanizes shipping terminal for U.S. Steel subsidiary

Two Barber-Greene conveyor systems, located 1600 miles apart in South America, help speed manganese ore from a Brazilian mine to a shipping terminal in Uruguay where the ore is loaded into ships for delivery to U.S. steel mills.

The shipping terminal is operated by Compania Navigen Sucursal Uruguaya, a U.S. Steel subsidiary, and began operation in 1958.

Navigen Company officials say, "The Barber-Greene conveyor equipment at the Transfer Station has operated very satisfactorily and was well chosen." Navigen's Technical Director at Nueva Palmyra during installation reports: "Barber-Greene factory assembled terminals were a great help in erection, particularly due to the scarcity of skilled labor. And we got needed technical and engineering support from Barber-Greene personnel from initial planning through erection and operational stages."

Three conveyors at mine

The mine installation at Corumba, Brazil, operated under contract with another U.S. Steel subsidiary, consists of two tunnel conveyors plus a third barge loading boom conveyor that extends out over the river and is adjustable to river levels and barge heights.

At the shipping terminal at Nueva Palmyra, Uruguay, six Barber-Greene conveyors totalling 2,655′ unload barges, stockpile the ore and reclaim it for loading into ocean-going vessels. Stockpiling capacity totals 75,000 tons.

Design features

Unique design features: Giant hurricane-proof cantilevered supports that are clear of the stockpile and under which the stockpiling conveyor is hung; reversible belt on the longest conveyor in the system which permits use of the same conveyor for both stockpiling and reclamation operations; run-around system that allows ore to be moved directly from barges to ships when stockpiling is not necessary; and a cantilevered ship loading shuttle conveyor that can be positioned to handle ships of various widths.

The same engineering skill that designed this heavy-duty system to handle 156 lbs./cu. ft. manganese ore is ready to work for you, or your engineering firm. Your Barber-Greene conveyor specialist will gladly explain how standardized or specially engineered systems, or a combination of both, can bring increased efficiency, dependability and lower costs to your material handling problem.

View of inclined conveyor used to reclaim ore from stockpile at Nueva Palmyra. All belts in system are 30″ wide and run at average 350 fpm speed. Some of the nearly 1,000 Barber-Greene heavy-duty roller-bearing idlers with 6″ diameter rolls are visible here.

Ore from 75,000 ton stockpile is reclaimed by 515′ tunnel conveyor fed by 33 gates. Material moves up inclined conveyor, over 854′ reversing conveyor and passes over shuttle conveyor enroute to ore boats.

Overall view of terminal shows how whirly crane used to unload barges, hopper, 42″ x 10′ Barber-Greene belt feeder and tail end of first inclined conveyor are all located hundreds of feet offshore on a cellular dock.

Upper view of 746′ stockpiling conveyor at Nueva Palmyra shows top cantiliver supports that resist winds up to 130 mph. Conveyor has traveling tripper that discharges incoming ore onto stockpile.

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New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

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PROPOSED PROJECTS

WATER SUPPLY

Ind., Milan—Village, Village Hall, 15 miles WATER LINE to wells at Aurora, **$700,000.**

▲ **Mich., Detroit**—City Water Supply, 726 Randolph St., Zone 26, WATER INTAKE, Lake Huron above Port Huron; water pumping plant, North Port Huron 53 mi. long 90 in. diameter water transmission line from Port Huron to various cities north and east, incl. Port Huron, Mount Clemens, Warren, East Detroit, St. Clair. **$172,000,000.** Ayers, Lewis, Norris & May Co., 500 Wolverine Bldg., Ann Arbor, Mich., consult. archts.-engrs. CD 7/19/55.

SEWERS, WASTE DISPOSAL

Mich., Lathrup—City, 19600 Forest Dr., STORM SEWER sys. through city and twp. **$519,000;** sanitary sewerage sys., Saratoga and Goldengate Aves. **$230,000.** Ayers, Lewis, Norris & May, 500 Wolverine Bldg., Ann Arbor, Mich., consult. engrs. Bids early 1961. CD 4/23/58 under LB.

▲ **Mo., St. Joseph**—City, City Hall, **$9,605,000** bond election Mar. 7, SEWAGE treatment plant and sewers and extensions. Black & Veatch, P.O. Box 8405 and 1500 Meadow Lake Parkway, Kansas City 14, Mo., consult. engrs. CD 6/1.

BRIDGES

▲ **N. Y., New York**—Dpt. P. Wks., Municipal Bldg., New York 7, Proj. PW-163, vertical lift BRIDGE over Harlem River at 207 St., Manhattan and Bronx Boros. **$8,660,000.** To go ahead after 1962.

▲ **PENNSYLVANIA**—State Hwy. Dept., 506 North Office Bldg., Harrisburg, (BRIDGE),
Lancaster & York Counties—bridge over Susquehanna River near Columbia, Pa., Columbia-Wrightsville Bypass. **$36,000,000.**

NEW BRUNSWICK—New Brunswick Dpt. P. Wks., Parliament Bldgs., Fredericton, BRIDGE,
Jemseg—3 steel girder spans 130, 170 and 130 ft., rein.-conc. supports for spans, Contr. 3, Jemseg River Bridge. Over **$500,000.** Foundation of Canada Engineering Corp. Ltd., 1989 Sherbrooke St. W., Montreal, Que., engr. Bids mid 1961.

STREETS AND ROADS

Fla., St. Petersburg—City, City Hall, PAVING, drainage, 1st Ave. S. 51st to 64th Sts., small bridge, **$567,800.** Bids Jan. or Feb. 1961.

▲ **N. Y., New York**—President Bronx Boro, 851 Grand Concourse, New York 51, Proj. PX-122, RECONSTR center roadway and malls, Grand Blvd. and Concourse between E. 161 St. and Mosholu Parkway **$4,600,000;** Proj. PX-126, wid'n. Grand Concourse between E. 138 St. and E. 161 St., Bronx Boro. **$1,700,000.** To go ahead after 1962.

▲ **Pennsylvania**—State Hwy. Dpt., 506 North Office Bldg., Harrisburg, (ROADS)
Philadelphia Co.—Vine St. Expressway eastward from 17th St. to Delaware Expressway and connections to the Benjamin Franklin Bridge, **$30,000,000.** Gannett, Fleming, Corddry and Carpenter, Inc., 600 N. 2nd. St., Harrisburg., Pa., consult. engr.
Bucks Co.—improvement 6.4 mi. U. S. Rte. 202 bet. Southampton and Richboro, **$1,000,000.** Turnpike Engineers, Inc., 1519 Walnut St., Phila., Pa., consult. engr.
Bucks Co.—improvement 3.02 mi. State Rte. 232 bet. Southhampton and Richboro, **$1,000,000. Turnpike** Engineers, Inc., 1519 Walnut St., Phila., Pa., engr.

▲ **PENNSYLVANIA**—State Hwy. Dpt., 506 North Office Bldg., Harrisburg, (ROAD),
Lancaster & York Counties—14 mi. relocation Rte. 30, Lincoln Hwy. from northwest of Lancaster city to near Hallam boro, York Co., **$7,700,000.**

EARTHWORK, WATERWAYS

▲ **Rhode Island**—U. S. Eng., 424 Trapelo Rd., Waltham, Mass., FOX POINT HURRICANE BARRIER DAM and pumping station, Sect. 11A, **$15,000,000** (no appro.). Charles A. Maguire & Assoc., Turks Head Bldg., and Fenton G. Keys Assoc., 202 Washington St., Providence, consult. engrs.

▲ **Md., Conowingo** — Philadelphia Electric Co., 1000 Chestnut St., Phila., Pa., four 65,000 kw TURBINES, hydro electric station, Conowingo Dam, Susquehanna River.

AIRPORTS

▲ **Ala., Huntsville** — National Aeronautical & Space Admin., George Marshall Space Flight Center, Bldg. 4435, plans by Wyatt C. Hedrick, 1200 T & P Bldg., Fort Worth, Tex., 205,000 sq. ft. Central LABORATORY and OFFICE, Marshall Space Flight Center, **$4,000,000.** CD 8/19/60.

▲ **Iowa, Cedar Rapids**—Airport Comn., Municipal Bldg., AIRPORT RENOVATING, **$2,500,000.** Howard R. Green Co., 417 First Ave. S. E., Cedar Rapids, Iowa, consult. engr. CD 8/30.

UNCLASSIFIED

▲ **La., Abbeville**—Abbeville Harbor Terminal District, Abbeville, HARBOR and terminal facilities near here, Bayou Vermillion. **$1,119,000.** Constr. begin in Sept. 1962.

▲ **N. Y., Brooklyn**—Dpt. Marine & Aviation, Battery Maritime Bldg., New York, Zone 4, Proj. D-272, SHIPPING TERMINAL, foot of 23 St., Gowanus Creek. **$6,900,000.** Moore-McCormack Lines, Inc., lessee. To go ahead 1961.

▲ **N. Y., Brooklyn**—Dpt. Parks, Arsenal Bldg., New York 21, Proj. P-340, Marine Park BEACHES, Plumb Beach and adjacent areas, Brooklyn Boro. **$6,136,000.** To go ahead after 1962. CD 8/14/57.

▲ **N. Y., Flushing**—Dpt. Parks, Arsenal Bldg., New York, Zone 21, Proj. P-87, Kissena Corridor Park DEVELOPMENT from Flushing Meadow Park to Cunningham Park, Queens Boro. **$10,059,275.** Some work in 1961. Major portion after 1961. CD 2/7/44.

▲ **N. Y., New York**—Hudson Harbor, Inc., 295 Fifth Ave., New York, N. Y., MARINA, swimming pool, heliport and seaplane facilities also hotel, Hudson River at Dyckman St., **$6,000,000.** William Tabler, 401 7 Ave., New York 1, N. Y., archt. for hotel. Morris Lapidus, Harle & Liebman, 139 E. 56 St., New York 22, N. Y., coordinating archts. Frederic R. Harris, Inc., 144 E. 44 St., New York 17, N. Y., consult. engr. To go ahead this summer. CD 9/20.

▲ **N. Y., New York**—New York City Transit Auth., 370 Jay St., Brooklyn 1, Proj. T-57, reconstr. 72 St. STATION, Broadway-7th Ave. Line, Manhattan Boro. **$10,000,000.** To go ahead after 1961.

▲ **N. Y., New York**—Dpt. Marine & Aviation, Battery Maritime Bldg., New York, Zone 4, Proj. D-87, PIER 94, piershed, bulkhead shed and equipment, North River. **$5,500,000.** To go ahead 1961.

▲ **N. Y., Rockaway Beach**—Dpt. Parks, Arsenal Bldg., New York, Zone 21, Proj. P-103 IMPRVT. adjacent areas Rockaway Beach. Queens Boro. To go ahead 1961. $2,000,000. Total est. **$5,000,000.** CD 10/22/48.

North Dakota—Northern States Power Co., 15 S. 5th. St., Minneapolis, Minn., NATURAL GAS FACILITIES EXTENSION, Fargo and Southwest Fargo, **$765,000;** natural gas distribution system, Grand Forks, **$545,000.** Bids 1961.

▲ **Tenn., Nashville**—City Park Commissioners, Centennial Park, plans by McKissack & McKissack, Morris Memorial Bldg., RECREATION BLDG., swimming pool and playground, Edgehill Ave., **$1,250,000.** Radar, Waggoner & Sumner, 1123 Church St., consult. engrs.

▲ **Texas**—Alamo Gas Supply Co., Alamo National Bldg., San Antonio, 166 mi., 20-24 in. GAS PIPE LINE, Zapata Co. to San Antonio, **$9,000,000;** 101 mi., 12-24 in. gas pipe line, near Hallettsville, Lavaca Co. to San Antonio, **$6,000,000;** gas-gathering system, Hallettsville, **$550,000;** compressor station, Hallettsville, **$700,000;** gas gathering system, Zaoata, **$750,000;** compressor station, Zapata, **$600,000.** Commonwealth Services, Inc., 300 Park Ave., New York, N. Y., consul. engr.

▲ **Ont., Toronto**—Canadian National Exhibition, Assoc., Queen Elizabeth Bldg., Exhibition Park, plans by Marani, Morris and Allan, 1250 Bay St., manufacturers' and HOME FURNISHINGS, Bldg., Exhibition Park, **$3,200,000.** CD 11/21/58.

PUBLIC BUILDINGS

▲ **Ala., Marion**—Marion Housing Auth., plans by Pearson, Humphries & Jones, 513 Madison Ave., Montgomery, 90 HOUSING units, **$1,000,000.**

▲ **Ark., Fort Smith**—Fort Smith School Dist., 400 N. 15th St., plans by Mott, Mobley & Horstmann, Merchants National Bank Bldg., Junior-Senior HIGH SCHOOL. **$1,250,000.** CD 12/13.

▲ **Calif., Huntington Beach**—Huntington Beach Union High School Dist., 1902 17 St., plans by Neptune & Thomas & Assoc., 742 Colorado Blvd., Los Angeles, Calif., HIGH SCHOOL, Springdale and Smeltzer Aves. **$1,000,000.** Constr. 1962.

▲ **Calif., Ontario**—Chaffey High School Dist., 5 and Euclid Ave., plans by Harnish, Morgan & Causey, 222 E. "B" St., Ontario, Calif., HIGH SCHOOL, Alta Loma. **$1,000,000.** CD 2/14/57.

▲ **Calif., Redwood City**—San Mateo Co., Hall of Justice, Redwood City, COUNTY CIVIC AUDITORIUM. **$3,809,000.**

▲ **Colo., Boulder**—State Planning Commission, State Capitol, Denver, ADMINISTRATION BLDG., University of Colorado, **$1,000,000.**

▲ **Conn., New Britain**—State Pub. Wks. Dpt., 165 Capitol Ave., Hartford, Health and Physical Education BLDG., Central Connecticut State College, **$2,624,000.**

▲ **Conn., New Britain**—Town, Bd. Educ., 27 Hillside Place, renovation New Britain High School. **$2,000,000.**

▲ **Del., Newark**—University of Delaware, Newark, plans by Howell, Lewis, Shay & Assocs., Packard Bldg., Phila., Pa., MATHEMATICS AND PHYSICS BLDGS., **$1,300,000.** Keast & Hood, 1201 Chestnut St., Philadelphia, Pa., consult. engrs.

▲† **D. C., Wash.**—Veterans Admin., Munitions Bldg., plans by Eggers & Higgins, Edwin A. Keeble Assoc., 100 E. 42nd St., New York, 17, N. Y., 700 bed GM & S HOSPITAL with Regional Office Medical Clinic, **$11,500,000** approp. Bids April/May 1961, CD 6/27/57.

▲ **Idaho, Moscow**—University of Idaho, SCIENCE BLDG., **$2,100,000.**

▲ **Ill., Chicago**—Chicago Transit Authority, Merchandise Mart, Chicago, Zone 54, TRANSIT BUS OVERHAUL BLDG., 77th. & Vincennes Ave., **$4,000,000.** DeLeuw Cather & Co., 150 N. Wacker Drive, Chicago 6, consult engrs. CD 2/8/60.

▲ **Ill., Collinsville**—Collinsville School Dist., Bd. Educ., plans by Robert Field, 813 Henry St., JUNIOR HIGH SCHOOL, **$1,286,000.** CD 12/19.

▲ **Ill., Pekin**—Community High School Dist., HIGH SCHOOL. **$3,975,000.** Bids in late 1961.

▲ **Kan., El Dorado**—Bd. Educ., El Dorado School Dist., **$1,500,000,** bond election Mar. 14, brick, concrete, etc., HIGH SCHOOL. Shaver & Co., 205½ S. Santa Fe St., Salina, Kan., archts. CD 11/30.

▲ **N. J., Belleville**—Bd. Educ., 183 Union Ave., plans by Alfonso Alvarez, 204 Montrose Ave., Upper Montclair, N. J., HIGH SCHOOL. **$1,000,000.** CD 1/8.

▲ **N. J., Cranford**—Bd. Educ. Cranford Twp., Central Ave., defeated referendum bonds and project Jan. 17, JUNIOR HIGH SCHOOL, Hillside Ave. **$2,500,000;** SENIOR HIGH SCHOOL, Orange Ave. **$3,000,000.** CD 11/22.

▲ **N. J., Emerson**—Bd. Educ. Boro Emerson, Linewood Ave., voted referendum Jan. 17, JUNIOR-SENIOR HIGH SCHOOL. **$2,300,000.** Knappe & Johnson, Underhill Rd., Scarsdale, N. Y., archts. CD 11/29.

▲ **N. J., New Brunswick**—Bd. of Trustees Rutgers University, University Pl., plans by Kassler & Weisbecker, 19 Nassau St., CLASSROOM-LABORATORY, Nichols Ave. **$1,250,000;** PHYSICAL EDUCATION BLDG. off George St. **$750,000,** for Douglass College. CD 12/13/60.

▲ **N. J., Roselle Park**—Bd. Educ. Boro Roselle Park, defeated referendum bonds and project Jan. 17, HIGH SCHOOL, Webster Ave. **$2,500,000.** Emil Schmidlin, 50 Evergreen Ave., East Orange, N. J., archt. CD 11/22.

▲ **N. J., Woodbridge**—Bd. Educ., Woodbridge Twp., Barron Ave., plans by Merchants Assoc., 1 Row St., New Brunswick, N. J., HIGH SCHOOL addn., Kelly St., **$1,080,000;** referendum bonds and proj. Feb. 14, elementary school, Port Reading section, **$600,000.** Murray Leibowitz, 214 Smith St., Perth Amboy, N. J., archts.; elementary school, Mawby Terrace, **$600,000.** Emil Schmidlin, 50 Evergreen Pl., East Orange, N. J., archts. CD 12/23/57.

▲† **N. M., Albuquerque**—General Services Admin., 19th and F Sts. N.W., Wash., D. C., plans by Flatow-Moore-Bryan & Fairburn, 1840 Lomas Blvd. N.E., FEDERAL OFFICE. **$10,000,000.** (No appro.). CD 6/24.

▲ **N. Y., Amherst**—Town, Town Hall, plans by Peter Carver Assocs., 235 W. 46 St., New York, N. Y., and Roeder J. Kinkel Assocs., 2201 Kensington Ave., Amherst, N. Y., 180x400 ft, 3,000 seating RECREATION CENTER, **$1,200,000.**

▲ **N. Y., Brooklyn**—Bureau Constr., Bd. Educ., 42-15 Crescent St., Long Island City 1, Proj. E-944, William H. Maxwell VOCATIONAL HIGH SCHOOL addn., Pennsylvania Ave. near Liberty Ave. **$2,900,000.** To go ahead after 1962.

▲ **N. Y., Glen Head**—Bd. Educ. Central School Dist. No. 1, Glen Cove Ave., plans by Perkins & Will, 55 Church St., White Plains, N. Y., JUNIOR HIGH SCHOOL, Kissam Lane School Site. **$1,725,000.** Seelye, Stevenson, Value & Knecht, 101 Park Ave., New York 17, N. Y., structural engrs. Segner & Dalton, 55 Church St., White Plains, N. Y., mechanical engrs. Bids in April. CD 12/12.

▲ **N. Y., Jamestown**—City, City Hall, CITY HALL. **$2,863,500.** Constr. to begin June 1962.

▲ **N. Y., New York**—New York City Housing Auth., 299 Broadway, New York 7, Proj. NY-556, 3 BUILDINGS (1) 9 story 70 units apartment, W. 94 St. between Columbus and Amsterdam Aves.; (2) 20 story 168 unit apartment, east side Columbus Ave., W. 91, W. 92 Sts.; (3) 19 story 162 unit apartment, east side Amsterdam Ave., W. 88 St., W. 89 Sts. **$6,758,000.**

▲ **N. Y., New York**—New York City Housing Auth., 299 Broadway, New York 7, Proj. NY-559, 20 story 156 unit APARTMENT, Amsterdam Ave. between West 100, West 101 Sts. **$3,000,000.**

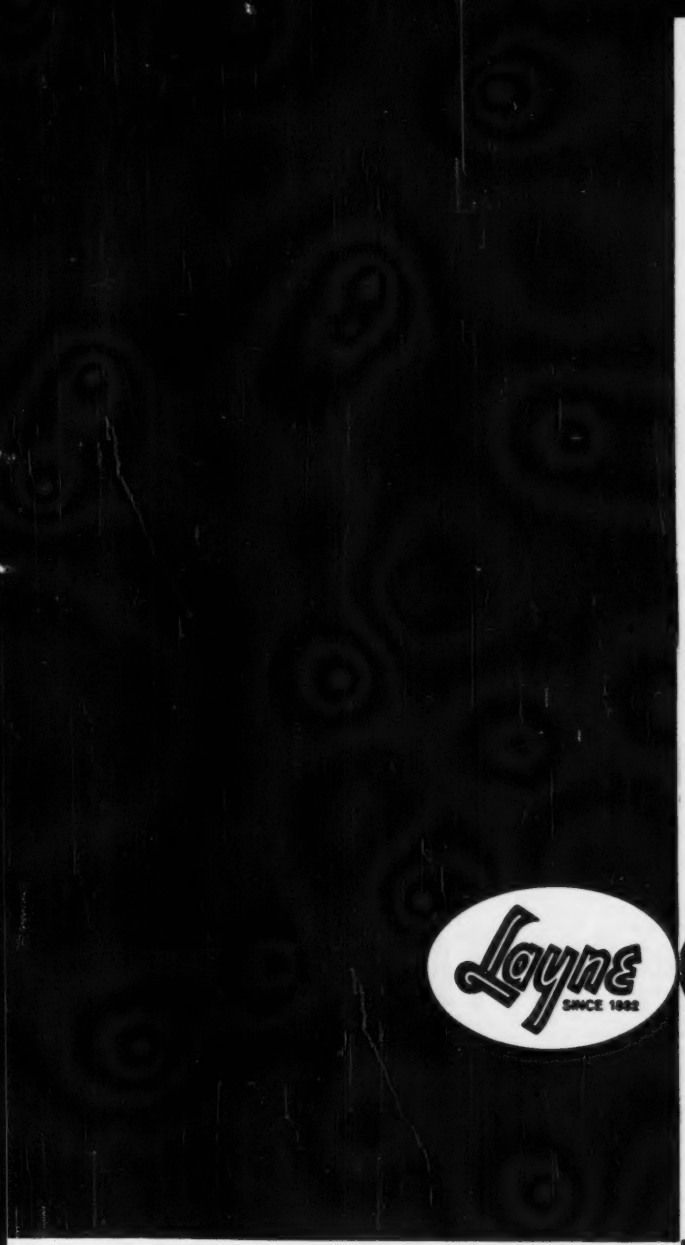
▲ **N. Y., New York**—Bd. Higher Educ., 535 E. 80 St., New York 21, Proj. HN-113, ACADEMIC BLDG., Baruch School of Business and Public Administration, City College, Downtown Site. **$5,000,000.** To go ahead after 1962. CD 10/20/44.

▲ **N. Y., New York**—Bd. Higher Educ., 535 E. 80 St., New York 21, Proj. HN-125, CLASSROOM and Theatre Bldg., City College, Uptown Site. **$4,450,000.** To go ahead after 1962. CD 10/20/44.

▲ **N. Y., New York**—Bureau Constr., Bd. Educ., 42-15 Crescent St., Long Island City, Proj. E-649, Machine and Metal Trades VOCATIONAL HIGH SCHOOL ADDN., 4320 E. 96 St. **$2,800,000.** To go ahead after 1962.

▲ **N. Y., New York**—Dpt. P. Wks., Municipal Bldg., New York 7, Proj. HO-598, PSYCHIATRIC ADDN., Metropolitan Hospital, 1901 1 Ave., Manhattan Boro. **$6,000,000.** To go ahead after 1962.

▲ **N. Y., West Seneca**—State Dpt. P. Wks., State Office Bldg., Albany,
180-bed Infant's Bldg, **$1,000,000;**
Maintenance Shop, **$350,000;**
Educational Bldg., **$1,750,000;**
8 structures to house slightly retarded, **$1,600,000;**
Medical-Surgical Reception Center, **$4,303,000;**
rehabilitation and special treatment bldg., **$870,000;**
State School for Mentally Retarded. Bids between Feb. 1 and Apr. 1. CD 1/18/56.



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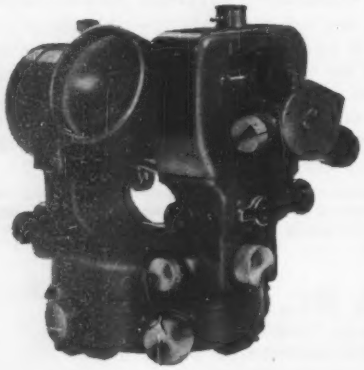


▲ **Pa., Franklin**—Franklin Area School Authority, plans by Buchart Associates, 611 W. Market St., York, SECONDARY SCHOOL. **$3,077,320.** CD 11/7.

▲ **S. D., Pierre**—General Services Admin., Room 6119, 18th and F St. N.W., Wash. 25, D. C., plans by Hughill, Blatherwick, Fritzel & Kroeger, Howard Parezo & Associates and Harold Spitznagle & Associates, 1800 S. Summit St., Sioux Falls, 130,000 sq. ft., POST OFFICE. Pierre St. and Sioux Ave. **$3,500,000.** Bids 1962. CD 6/27.

▲ **S. D., Sioux Falls**—General Services Admin., Room 6119, 18th and F Sts. N.W., Wash. 25, D. C., plans by Hughill, Blatherwick, Fritzel & Kroeger, Howard Parezo & Associates, and Harold Spitznagle & Associates, 1800 S. Summit St., 126,000 sq. ft. POST OFFICE, 12th St. and 2nd Ave. **$3,500,000.** Bids 1962.

▲ **Tenn., Nashville**—Davidson Co., Courthouse, 8-15 story, COUNTY OFFICE, Public Square, **$2,000,000.**

▲ **Tex., Fort Worth**—Tarrant County, Courthouse, plans by Easterwood & Easterwood, 522 N. P. Anderson Bl., 12 story, 126 x 116 ft., masonry conc., steel, air conditioned CRIMINAL COURTS AND JAIL. **$3,500,000.** CD 12/21/59.

▲ **Va., Leesburg**—Loudoun Co. School Bd., **$3,000,000** bond election Feb. 14, Broad Run SCHOOL, $500,000; Purcelleville High School $1,500,000. CD 8/18.

▲ **Wash., Seattle**—State Dpt. of Institutions, General Admin. Bldg., Olympia, DORMITORIES for 300 retarded children, Fircrest School, **$1,563,360.**

▲ **Wash., Tacoma**—State Dpt. of Institutions, General Admin. Bldg., Olympia, remodel Cushman Indian Hospital to provide HOUSING for 235 delinquent children, **$1,097,920.**

COMMERCIAL BUILDINGS

▲ **Ala., Mobile**—Tex-Craft Builders, Inc., 4904 Travis St., Houston, Tex., 204-unit Ramada Inn MOTEL, **$2,750,000.**

▲ **Ark., Little Rock**—Winrock Enterprises, 207 West 2nd St., 457 HOUSES, Richland subdivision east of airport, **$4,000,000.**

▲ **Calif., San Francisco**—University of San Francisco, 1379 Third Ave., plans by Milton T. Pflueger, 580 Market St., San Francisco, Calif., SCIENCE CENTER. **$3,000,000.** Constr. 1961.

▲ **Colo., Denver**—Hampshire Investment Co., 1490 Galapago, plans by Donald R. Roark, 101 S. Madison St., 82 units, 15 story Hampshire House APARTMENT, 10th & Grant Sts., **$1,100,000.**

▲ **Colo., Denver**—Owner c/o Bennett T. Martin, 2399 E. Floyd Place, plans by Selmar Solheim Assocs., 655 Broadway, 12 story, 91 units APARTMENT, 777 Logan St., two levels underground parking, **$1,500,000.**

▲ **Colo., Denver**—Porter Hospital, 2525 South Downing, plans by Fisher & Davis, Denver National Bldg., 100 bed, HOSPITAL WING, **$2,250,000.**

▲ **Colo., Pueblo**—Jess Kortz, Equitable Bldg., Denver, plans by Flickinger & Assocs., 1718 Gaylord St., 2 story, 90 units swimming pool, MOTOR HOTEL, **$1,000,000,** CD 1/22/59 under park Hotel Corp.

▲ **Fla., Casselberry (Br. Fern Park)**—Eastern Shopping Centers, Inc., 61 Mall Walk, Yonkers, N. Y., 235,000 sq. ft. SHOPPING CENTER, U. S. Hys. 17 and 92, at Lake Howell Rd., **$2,000,000,** D. E. Britt & Assocs., 1766 Miami Beach, Fla., consult. engrs.

▲ **Fla., Miami**—Dextra Center Corp., c/o Kononoff-Smith & Hammer, archt. and engrs., 2901 Pounce DeLeon Blvd., Coral Gables, OFFICE, NW 20th St., east of Lejeune Rd., precast conc., **$1,500,000.** Bids late 1961.

▲ **Fla., Miami Beach**—456 Treasure Corp., c/o Mackay & Gibbs, archts., 402 71st St., 4 story, 105 x 215 APARTMENT, air conditioning, 1880 S. Treasure Dr., N. Bay Village, **$1,000,000.** Oboler & Clarke, 925 Arthur Godfrey Rd., Miami Beach, Fla., consult. engrs.

▲ **Ill., Chicago**—Presbyterian Hospital, 1753 Congress St., hospital HEALTH CENTER, Harrison and Wood Sts., **$2,000,000.** Bids in Summer. CD 10/8/56.

▲ **Ind., Indianapolis**—Lafayette Realty Corp., c/o Eagledale Plaza Shopping Center Corp., 1542 W. Washington, SHOPPING CENTER ADDN., Lafayette Rd. and W. 30th. St., **$1,500,000.**

▲ **Mass., Natick**—Paul Mark Management Corp., 726 Providence Hy., Dedham, Mass., RESIDENTIAL DEVELOPMENT, 140-180 houses, Reservoir Woods, east Union St. **$2,000,000.**

▲ **Mass., Woburn**—Hawthorne-Hedges Corp., c/o J. Cardinale, 499 Main St., Stoneham, Mass., plans by B. C. Gallo, 409 Chelsea St., East Boston Mass., APARTMENTS. **$2,000,000.** Constr. 1961.

▲ **Mo., St. Louis**—Bel Air Motel Co., c/o Bel Air Motor Hotel, 4630 Lindell Blvd., St. Louis 8, plans by Hausner & Macsai, Inc., 104 S. Michigan Ave., Chicago, Ill., 12 story Bel Air East MOTEL, 200 parking, swimming pool convertible to ice skating rink, Washington and Lucas Ave., 3 St. and Mark Twain Expressway. **$2,500,000.** Bids 60-90 days.

▲ **N. J., Asbury Park**—Owner, c/o Tito P. Di Vincenzo, archt., 135 E. 65 St., New York, N. Y., two APARTMENTS, Bond St. **$4,000,000-$5,000,000.** To go ahead this summer.

▲ **N. J., Newark**—Hot Shoppes, Inc., 5161 River Rd., Wash., D. C., 300-room MOTEL, Newark Airport. **$3,000,000.**

▲ **N. Y., Buffalo**—General Services Admin., 18 and F Sts. N.W., Wash. 25, D. C., plans by James, Meadows & Howard, 250 Delaware Ave., Buffalo, N. Y., build-lease, 3 story 355,000 sq. ft. POST OFFICE and 1 story truck terminal, William St. **$15,000,000.** CD 12/2/49, under Public Buildings.

▲ **N. Y., New York**—Benenson-Rose-Tisch, 529 Fifth Ave., New York 17, N. Y., plans by Emery Roth & Sons, 400 Park Ave., New York, N. Y., 13 story 92x205 ft OFFICE, 61-77 W. 46 St. **$3,285,000.**

▲ **N. Y., New York**—8003 Corp., 119 W. 40 St., New York 36, N. Y., plans by Emory Roth & Sons, 400 Park Ave., New York, N. Y., 30 story 124x200 ft OFFICE, 1029-1043 Second Ave. **$5,300,000.**

▲ **N. Y., New York**—Dworman Assocs., 400 Park Ave., New York 22, and Cooper-Bergstein Realty Co., 60 E. 42 St., New York 17, plans by Emery Roth & Sons, 400 Park Ave., New York 22, N. Y., 25 story, 250,000 sq. ft. OFFICE, W. 48 St. and 6 Ave. **$6,500,000.**

▲ **N. Y., New York**—Mississippi River Development Corp., 383 Madison Ave., New York, N. Y., plans by John H. Barry, 385 Madison Ave., New York, N. Y., 35 story, 117x200 ft OFFICE, 1320-1326 Sixth Ave. **$10,000,000.**

▲ **N. Y., New York**—Abraham Sommer, P. O. Box 188, Iselin, N. J plans by Emory Roth & Sons, 400 Park Ave., New York, N. Y., 23 story 200x290 ft OFFICE, 134-146 W. 51 St. **$8,400,000.**

▲ **O., Toledo**—Horizon Enterprises, Wooster, 800 HOMES, 473 acre site eastern Jerusalem Twp., **$12,000,000-15,000,000.**

▲ **Pa., Doylestown**—Becker & Lipschutz, 4417 N. Broad St., Phila., 100 units Garden Type APARTMENTS, Rte. 611, over **$1,000,000.**

▲ **Pa., Mt. Lebanon**—Kaufmann's Dpt. Store, 5th & Smithfield Sts., plans by John Graham, 444 5th. Ave., New York, N. Y., 1 story, 170,000 sq. ft. STORE, 800 car parking, Washington & Gilkeson Rds., **$2,500,000-$3,000,000.** Bids Spring 1961.

▲ **Pa., Phila.**—David Peace, 68th. & Walnut St., Upper Darby, plans by Geddes, Brecher & Quall, 258 S. Van Pelt St., 300 unit APARTMENT, swimming pool, parking lot, School House Lane, over **$2,500,000.** David Bloom, 225 S. 15th. St., consult. engr. Bids Spring 1961. CD 12/13 under Owner c/o archts.

▲ **Va., Alexandria**—Carolan H. Ellis, c/o Foster Wood, 1028 Connecticut Ave. N. W., Wash., D. C., 200-unit, 9 story APARTMENTS, **$3,200,000.**

▲ **Va., Chantilly**—Syndicate, c/o A. Frank Krause, Ford Bldg., Fairfax, plans by Victor B. Spector, 207 W. Broad St., Falls Church, Chantilly-Dulles COMMERCIAL CENTER, Rte. 50 and Rte. 657, seven year program. First year 7 stores $750,000. Total cost **$30,000,000.** To go ahead summer.

INDUSTRIAL BUILDINGS

▲ **Ariz., Phoenix**—General Electric Co., Computor Division, Deer Valley Park, 190,000 sq. ft., 1 story, steel PLANT addn., **$4,000,000.** Bids March 1961.

▲ **Conn., Bethel**—Kanthal Corp., Amelia Place, Stamford, 173,000 sq. ft. MFG. BLDG., Wooster St., **$1,730,000;** 105,000 sq. ft. high frequency furnaces, for mfg. plant, Wooster St., **$1,050,000;** 14,000 sq. ft. mfg. plant, Wooster St., **$173,000.** CD 7/11.

▲ **Iowa, Mason City**—Globe-Gazette Publishing Co., 121 E. State St., 1 story and basement, 20,000 sq. ft. newspaper PLANT, 4th St. N. W. and Washington, **$1,000,000.**

▲ **Mich., Frankenmuth**—Carling Brewing Co., 9400 Quincy Ave., Cleveland 6, O., BREWERY addn. **$1,500,000.** McGeorge-Hargett & Hoag, 7016 Euclid Ave., Cleveland 3, O., consult. engrs. Bids Apr. 1.

▲ **Pa., King of Prussia**—Western Electric Co., Inc., 195 Broadway, New York, New York, plans by Lockwood Greene Engineers, Inc., 41 E. 42nd. St., New York, N. Y., DISTRIBUTION CENTER, RR siding, parking area, etc., **$7,000,000.** Bids Spring 1961. CD 8/22/58.

▲ **Pa., Phila.** — Philadelphia Industrial Development Corp., 1421 Chestnut St., and West Philadelphia Corp., 325 Walnut St., 33 story, 1,000,000 sq. ft. Industrial RESEARCH CENTER, site adjoining University of Pennsylvania, and Drexel Institute of Technology, 4 acres, **$30,000,000.** Tom McCormick, 1617 Pennsylvania Blvd., consult. engr. Construction fall 1961.

▲ **Tenn., Rockford** — Tennessee Farmer's Cooperative, Lavergne, FEED MILL, **$1,000,000.** James Smith, Lavergne, consult. engrs.

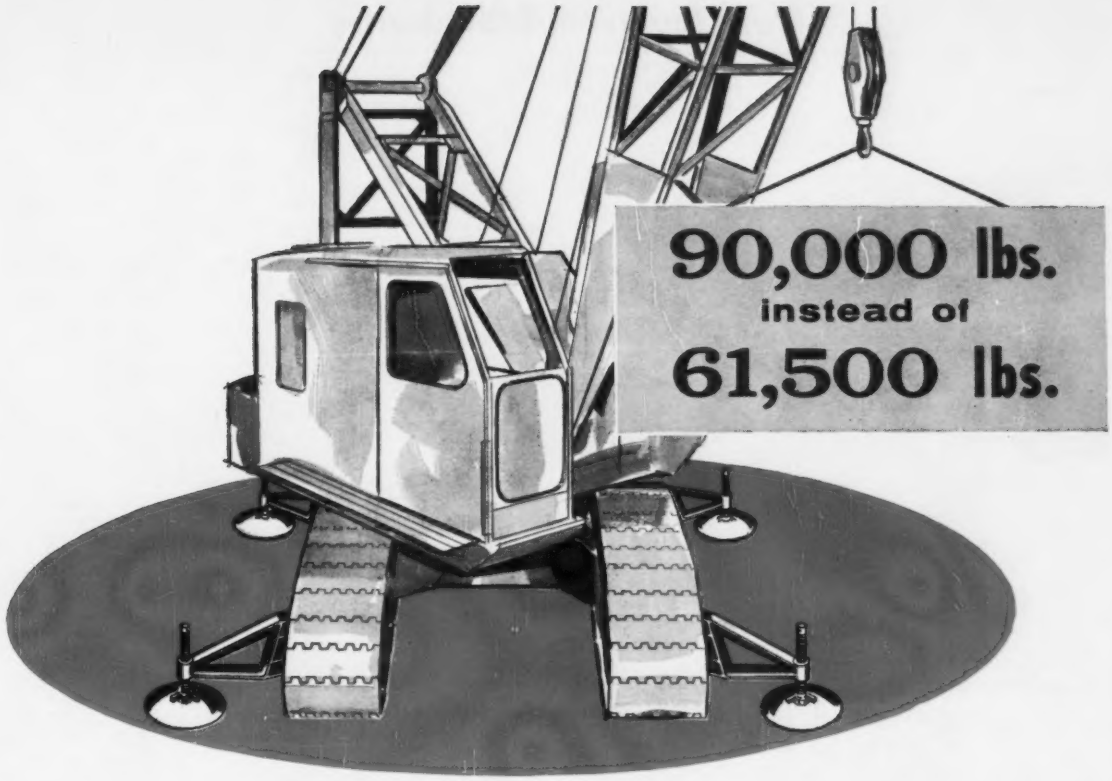
LATIN AMERICA

▲ **Surinam, Paramaribo**—P. Wks. Dept. of Surinam, Paramaribo, HARBOR development. **$8,062,500.** Bids after June 1961.

FOREIGN

▲ **Iraq, Baghdad**—Sayid Madhat Amin, Dir. of National Electricity Services, Baghdad, 19 story OFFICE for Baghdad Electricity Services. **$3,920,000-$5,600,000.** Bids in one year.

▲ **SPAIN**—Ministry of Aviation, Plaza de la Moncloa, Madrid, IMPROVING Barajas Airport, Madrid; Prat Airport, Barcelona; Gando Airport, Canary Islands; airports at Palama de Majorca and Malaga. **$64,600,000.** Interested contractors may apply for information.



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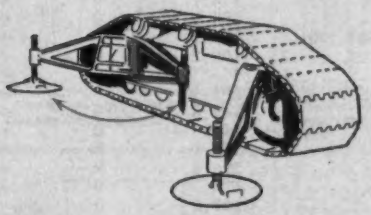

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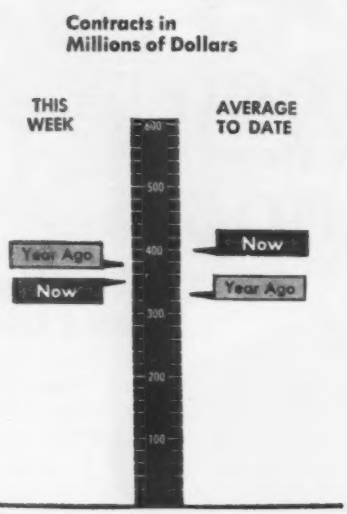
545 Sprawler MAXIMUM LIFT CAPACITY WITH OUTRIGGERS IN PLACE: 90,000-lb	545 Sprawler MAXIMUM LIFT CAPACITY WITH PEDESTALS RAISED FOR WALKING: 61,500-lb

There's a Model 330 Sprawler, too! Lift bonus is 69%. The 330 will walk loads up to 35,450-lb, but with outriggers in place will lift 60,000-lb. See your distributor for details. K29

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

Construction Scoreboard

This Week...



AMOUNT OF CONTRACTS LET

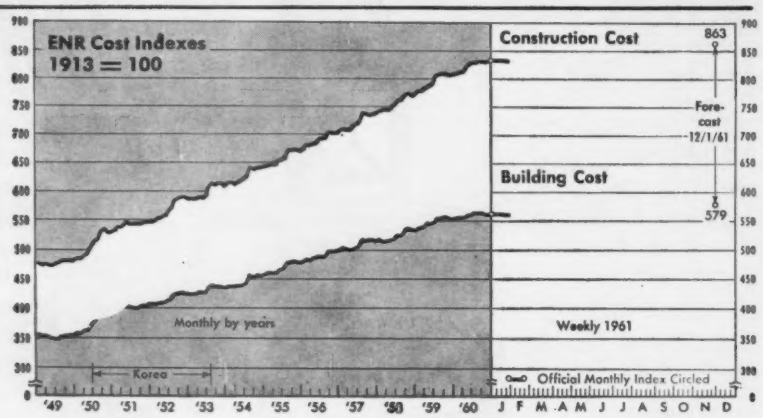
Contracts Awarded In 50 States By Type	This Week millions	Cum. 5 wks 1961	Chge '60-'61 %
All Heavy Construction	$346.4	$2,007.0	+22
By Ownership			
PRIVATE	176.7	961.6	+11
PUBLIC	169.7	1,045.4	+35
State & Municipal	148.1	789.2	+37
Federal	21.6	256.2	+29
By Type of Work			
PUBLIC			
Waterworks	6.9	27.0	+10
Sewerage	14.1	50.7	−18
Bridges*	9.7	52.6	−12
Highways	54.8	404.3	+90
Earthwork, Dams & Waterways	6.5	60.6	−17
Buildings:			
Excl. Housing	31.1	282.8	+82
Housing	8.6	47.1	−24
Unclassified	37.9	120.3	−5
PRIVATE			
Buildings:			
Mass Housing	77.6	351.5	+1
Commercial	40.7	178.4	−10
Industrial	46.3	373.2	+38
Unclassified	12.2	58.5	+21

*Includes Private bridges

NOTE Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of Jan. 26 millions	Cum. 4 wks 1961	Chge '60-'61 %
Corporate Securities	$82.9	$149.4	+17
State and Municipal:			
All Except Housing	202.7	453.2	−39
Housing	1.1	1.5	+150
Federal Loans	1.3	26.4	+654
Federal Aid	0.0	0.0	0
Total Nonfederal	$288.1	$630.5	−28
Federal Appropriations:			
Projects in U.S.	0.0	0.0	0
Outside U.S.	0.0	0.0	0
Total New Capital	$288.1	$630.5	−28



ENR INDEXES (1913=100), 20-cities' average	Week of Jan. 26 1961	% Change from Dec. 29 1960	% Change from Jan. 28 1960
Construction Cost	834.25	−0.01	+2.6
Building Cost	562.91	0	+1.3

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

Latest Month . . .

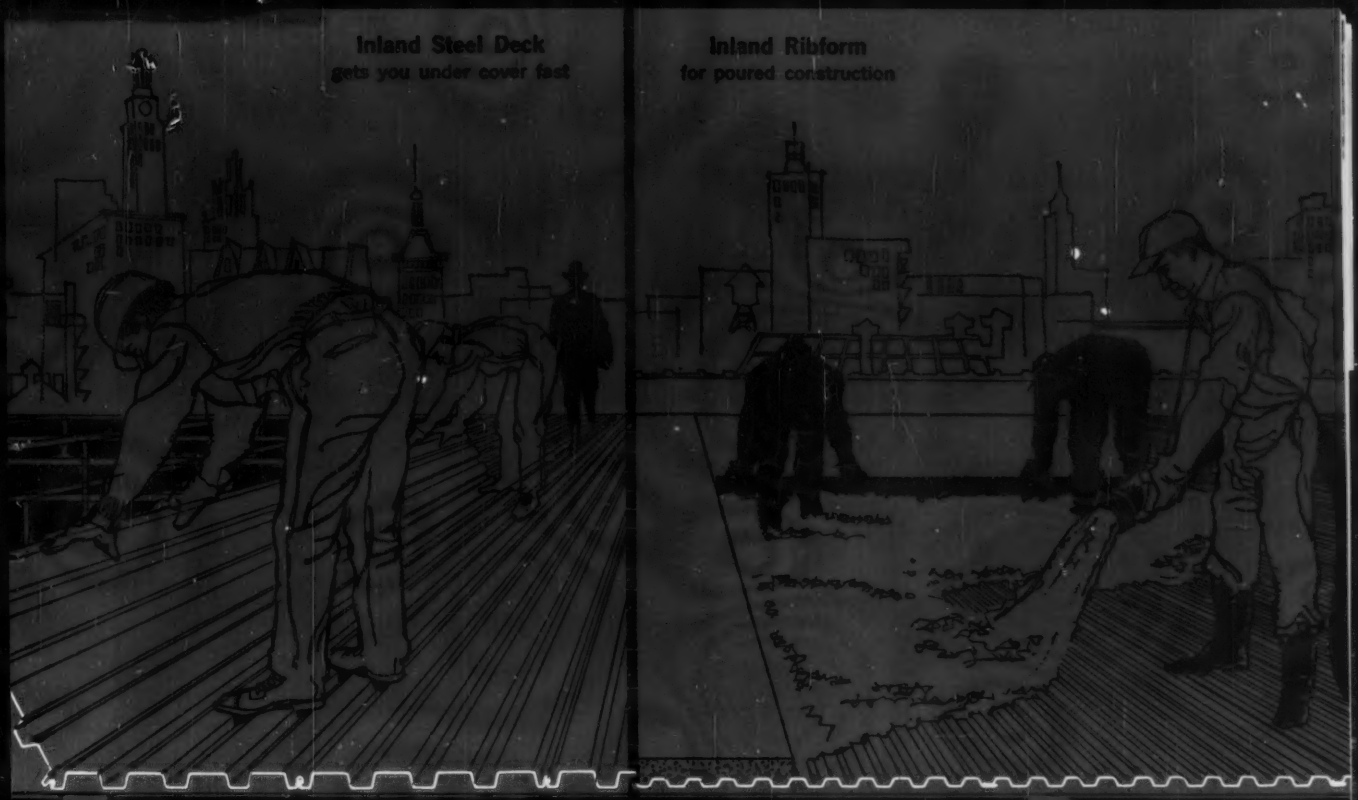
STATE AND MUNICIPAL BOND SALES

	1961 Jan. (millions)	1960 Dec. (millions)	Percent Change* from 1960 Dec.	Jan.
All Construction	$449.7	$564.1	− 0.4	−40.0
Buildings	313.5	319.9	+ 22.5	−17.2
Schools	305.5	177.2	+115.5	+36.4
Housing	1.5	42.8	− 95.6	+150.0
Other buildings	6.5	99.9	− 91.9	−95.8
Heavy Construction	136.2	244.2	− 30.3	−63.2
Waterworks	21.9	76.9	− 64.4	+ 5.3
Sewerage	25.6	26.6	+ 20.3	−20.3
Bridges	.....	0.04	−100	−100
Highways	36.8	76.1	− 39.6	−23.7
Earthwork, dams, waterways	17.3	2.0	+981.3	−85.7
Electric and gas utilities	0.4	12.6	− 96.0	−99.5
Airports	0.5	4.0	− 84.4	−94.4
Parking facilities	1.3	4.3	− 62.2	+30.0
Unclassified	32.4	41.7	− 2.9	−43.1

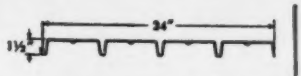
* Based on average week: 4 weeks in Jan. '61; 5 weeks in Dec. '60 and 4 weeks in Jan. '60.

CONSTRUCTION MACHINERY PRICE INDEXES

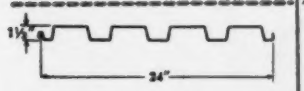
Manufacturers Prices, 1947–49=100—BLS	Dec. 1960	Percent Change from last Month	Year
All Types	177.1	−0.2	+2.4
Cranes, Draglines, Shovels	173.5	−0.4	+1.8
Shovel, ¾ cu yd	175.4	0	−0.9
Shovel, 1–1½ cu. yd	189.3	0	+2.7
Shovel, 2–2½ cu. yd	169.1	−2.0	+2.7
Crane, truck mounted	168.2	0	+1.2
Scrapers and Graders	166.6	0	+0.5
Scraper, 4 Wheel, 12–15 cu yd	156.8	0	0
Grader, heavy duty	174.1	0	+0.9
Tractors (non-farm; incl. industrial)	195.3	0	+3.5
Wheel-type, off-highway (January 1955=100)	129.2	0	+1.5
Crawler type, 100–154 dhp	199.2	0	+3.5
Machinery, Tractor Mounted	176.7	0	+4.6
Dozer, hydraulic control	201.9	0	+8.2
Loader, shovel type	164.6	0	+1.3
Specialized Machinery	158.8	0	+1.7
Ditcher	153.8	0	+2.5
Roller, tandem	226.4	0	+2.8
Roller, 3 wheels	178.7	0	+2.2
Portable Air Compressors	167.5	0	0
Contractors Air Tools	181.6	0	0
Mixers, Pavers, Spreaders	157.1	−0.2	+0.3
Mixer, truck, 6 cu yd	131.9	−0.9	−0.6
Mixer, paving, 34 cu ft	196.7	0	+1.6
Bituminous paver	165.6	0	+1.5



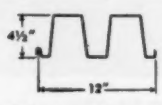
Steel deck or centering...you name it, INLAND has it!



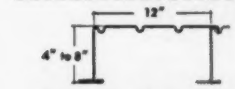
A-DECK — For purlin spacings not exceeding 8'4". Narrow ribs provide deck surface that supports the thinnest or softest types of insulation.



B-DECK — For spans to 10'0". Wide rib distributes metal for greater structural efficiency. Well suited for use as side wall panels.

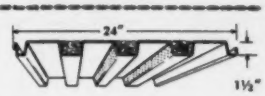


C-DECK—Carries normal roof loads over spans up to 24'0". Used extensively in canopies.

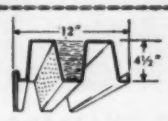


T-STEEL — New! Galvanized only. For clear spans to 32'0". Adaptable to acoustical and flush, luminous ceiling treatments. Provides superior diaphragm to resist seismic and wind loads.

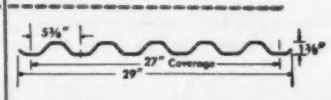
H-DECK — New! For simple spans to 20'0" — 3" and 4½" depths. Especially practical to cover walkways in shopping centers, schools, other installations.



B-ACOUSTIDECK — Two-in-one panel combines steel roof deck with acoustical ceiling having Noise-Reduction Coefficient of .70. Used for spans to 10'0".



C-ACOUSTIDECK — Offers same Noise-Reduction Coefficient as B-Acoustideck. Can be used for spans to 24'0".



RIBFORM — High-tensile, galvanized steel form for concrete slabs over spans up to 8'0". Three types: Standard, Heavy-Duty, Super-Duty (shown).

Expansion projects and new buildings get under cover fast and economically, when you specify an Inland roof system.

Inland steel deck is easy to handle and weld in place — in any weather that a man can work. Effects of construction abuse are held to a minimum, since types A, B, C, and H decks are Bonderized, then covered with a baked-enamel primer that resists on-the-job damage. One field coat of paint over this is usually enough.

In concrete-over-steel construction, Inland Ribform supports wet concrete with minimum deflection. Rigid sheets are quickly and inexpensively attached to supports — in place, they provide a safe work platform for crews.

Write for catalogs 240, 241, and 245 — see Sweet's sections 2c/Inl, 11a/In, and 2a/In. For help on unusual problems, you can draw on the diversified experience of Inland sales engineers. Write or call your nearest Inland office.

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ENGINEERED PRODUCTS DIVISION

INLAND STEEL PRODUCTS COMPANY

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EP-5A

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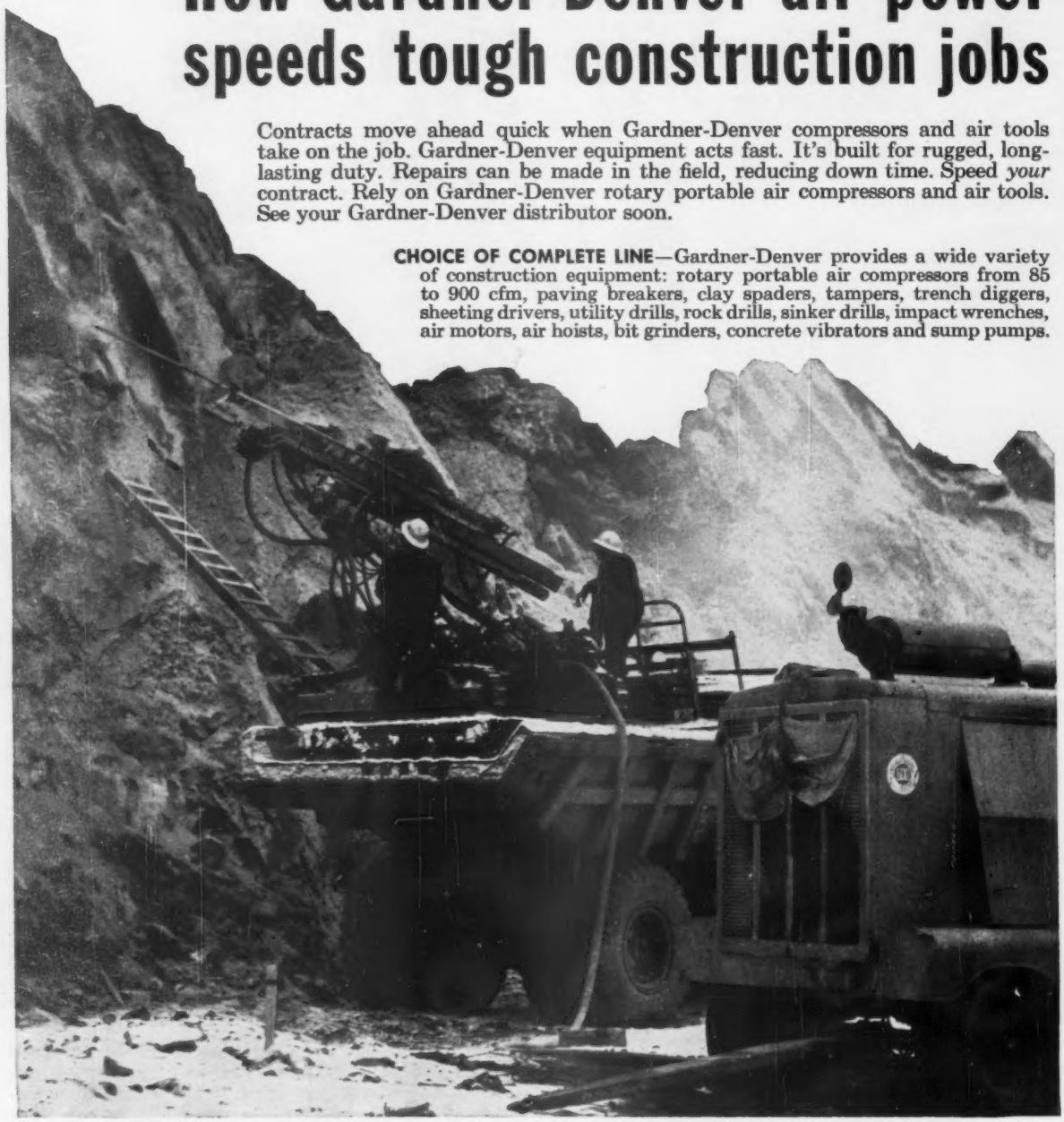
How Gardner-Denver air power speeds tough construction jobs

Contracts move ahead quick when Gardner-Denver compressors and air tools take on the job. Gardner-Denver equipment acts fast. It's built for rugged, long-lasting duty. Repairs can be made in the field, reducing down time. Speed *your* contract. Rely on Gardner-Denver rotary portable air compressors and air tools. See your Gardner-Denver distributor soon.

CHOICE OF COMPLETE LINE—Gardner-Denver provides a wide variety of construction equipment: rotary portable air compressors from 85 to 900 cfm, paving breakers, clay spaders, tampers, trench diggers, sheeting drivers, utility drills, rock drills, sinker drills, impact wrenches, air motors, air hoists, bit grinders, concrete vibrators and sump pumps.



EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

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Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

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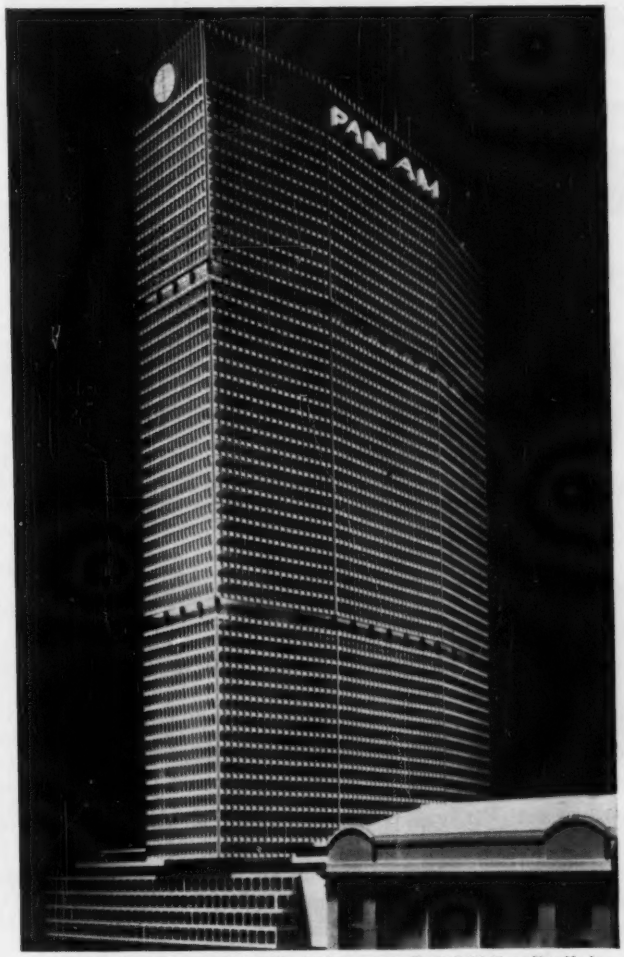
select a precast white concrete facade for the Pan Am Building, the world's largest commercial office structure. Made of ATLAS WHITE portland cement and exposed quartz aggregate, the concrete units will consist of mullions, spandrels and lintels cast in one piece to create a striking concrete curtain wall.



Pan Am Building being erected in New York. **Owners:** Erwin S. Wolfson, New York, and Jack Cotton, London. **Architects:** Emery Roth & Sons, New York. **Design Consultants:** Walter Gropius (T. A. C.) and Pietro Belluschi (M. I. T.) **Structural Engineer:** James Ruderman. **Genl. Contractor:** Diesel Construction Company, New York. **Concrete Panel Manufacturer:** "Mo-Sai" by The Dextone Co., New Haven.

□ Today, more architects are specifying precast concrete because it offers them design freedom, construction economy, low-cost maintenance. It is being used in a variety of sizes, shapes, colors, textures . . . and anchors easily to any structural frame. For information on white portland cement in precast concrete, write Universal Atlas, 100 Park Avenue, New York 17, N. Y.

Universal Atlas Cement
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WP-80

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heavy duty disc assembly that lasts and lasts!

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. . . ideal for use in pump suction or discharge lines to cushion and reduce slamming and hammering. Lever may be positioned to speed up or slow down closing of disc. Weight is easily adjusted in field.

Iron Body — Fully Bronze Mounted
Bronze Seat Ring
Bronze Disc Ring or Rubber Faced Disc
Flanged, Screwed or Hub Ends
Working Pressure: 175 p.s.i.
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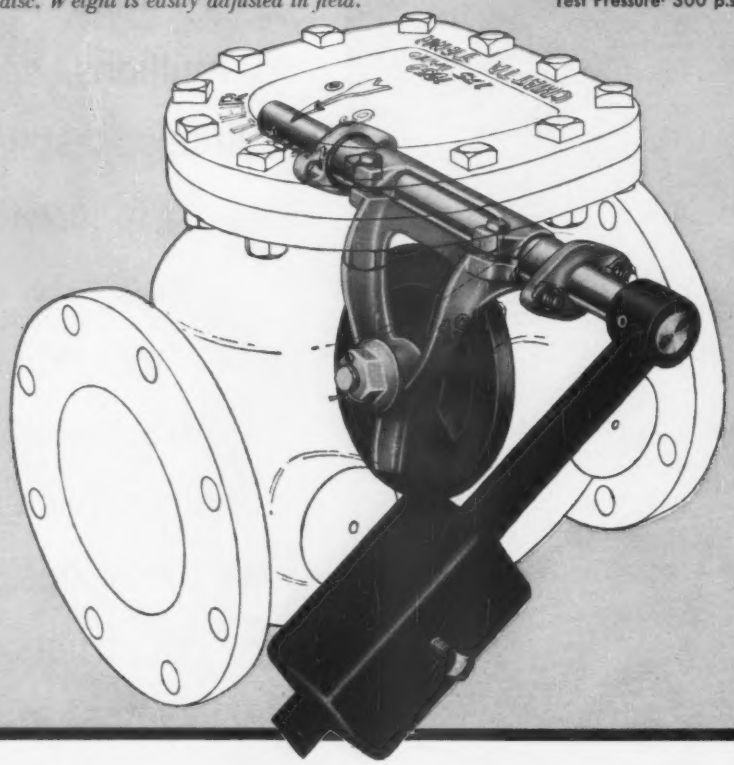

All working parts of these new Mueller Swing Type Check Valves are heavily made to assure long service life and dependable operation *without maintenance.*

A heavy stainless steel hinge pin is used on all lever and weight type (shown) and lever and spring type check valves. This pin is extended through the hinge plugs to permit the lever to be used on either side of the body. An "O" ring on the plug prevents leakage around the pin.

The plain type, without lever, weight or spring, uses a new combined hinge pin and plug which is securely and accurately held to the body by studs and nuts. An "O" ring positively seals the plug to prevent leakage.

Large, wear-resistant bearings and a full-width clapper arm hinge, used in all types, accurately and rigidly align the disc to eliminate chatter and vibration.

These new, heavy duty check valves have been specifically designed for repeated opening and closing applications in water works pumping stations, water filtration plants, sewage treatment plants and general industrial plants. They are suitable for horizontal or vertical installation on water or oil lines.

Write for specifications.

The many exclusive features of these new check valves are typical of the attention to detail in research, design and engineering that becomes a part of every Mueller product.

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Hot Building Market in Cooling?

A major manufacturer of air conditioning equipment hopes to develop a massive market for cooling equipment through widespread development of central combination cooling-heating plants serving large sections of a community. Should the idea catch hold, it could also add hundreds of millions of dollars to the construction industry's market in new buildings and distribution lines.

The concept has already been sold in Hartford, Conn., where such a central system will go into operation next year. Hartford Gas Co. is investing about $3 million in a new central cooling-heating plant and two to three miles of pipelines to distribute steam and chilled water from the plant to customers (ENR Jan. 26, p. 30).

Carrier Corp. of Syracuse, N. Y., manufacturer of the equipment to be used in the Hartford installation, has high hopes. Russell Gray, president of Carrier's sales subsidiary, Carrier Air Conditioning Co., considers the Hartford installation a pilot project that will prove the practicability and sound economics of central cooling-heating systems for large sections of a city.

Right now, Carrier's expectations are pegged to urban redevelopment projects. These large developments easily lend themselves to the central-system concept. But they also provide the reason and the means for selling the centralized service to buildings around the development proper.

Hartford Gas Co. has already succeeded in this respect. Although the new system is coming into existence as a direct result of Hartford's $35-million urban redevelopment project now under way, several other major companies have already contracted to buy cooling-heating service from the utility.

The New York City consulting engineering firm of Seelye, Stevenson, Value and Knecht, designer of the Hartford system, is also optimistic. Erik B. J. Roos, a partner in the firm, says the idea has "a great future."

Carrier even went so far as to measure the potential offered by 50 urban redevelopments in 25 major cities. The projects planned and under way represent investment in buildings of more than $5 billion. If these projects, and building nearby, were to utilize the central cooling-heating idea, 335,000 to 800,000 tons of cooling would be required.

The Hartford plant, having an initial capacity of 6,500 tons of refrigeration, is costing $3 million.

It's possible that utility buildings and the distribution lines for a central cooling-heating system in the 50 projects could mean construction volume in excess of $300 million. This rough estimate may be subject to revision up or down, depending on the heating and cooling requirements in the geographic areas, topography and other special circumstances.

Among the projects Carrier cites as candidates for utility-supplied cooling and heating are the $127-million Charles Center in Baltimore, the $150-million Prudential Center in Boston, the $42-million Gateway Center in Minneapolis, and the $100-million Washington Market project and the $250-million World Trade Center, both in New York City.

Although the probable cooling requirements for the projects have been estimated, Carrier has not reached any conclusions as to the suitability of the system in each.

Contractor Failures Soared in '60

Failures among construction contractors broke all records last year. A total of 2,607 contractors went under, according to Dun & Bradstreet. The total exceeds that of the depression days of the early 1930s and was a 26% increase over 1959.

The failure-record was broken in the face of a record year for construction contract awards as reported by ENR.

The rise in liabilities of failing contractors was even greater, soaring 65% above 1959 to $201.4 million.

General building contractors were hit hardest last year. The total of 1,020 was 36% over 1959. It was the first time the number of failures among general building contractors topped 1,000. Their liabilities of $110.7 million were 67% more than the liabilities of those who failed in 1959.

"Other contractors"—those doing heavy construction other than building—wound up the year with 8% more firms in financial trouble than the year before. The total of 168 was also a new record.

Most significant key to the severity of contractor difficulties last year is the big rise in large-size failures—those over $100,000. These failures increased 67% and liabilities rose 87% to more than $140 million.

The Middle West and Far West accounted for the biggest number of contractor failures and the biggest volume of liabilities. New England turned in the best record. In that region the number of bankruptcies dropped 20% and liabilities rose only 6%.

Contractor Failures—1960—Type, Size, Region

Reported by Dun & Bradstreet, Inc.

	Number		%	Liabilities ('000)		%
	1960	1959	Chg.	1960	1959	Chg.
U. S. TOTAL	2,607	2,064	+26	$201,369	$121,883	+65
By Type of Contractor						
General building contractors	1,020	749	+36	110,656	66,075	+67
Building subcontractors	1,419	1,159	+22	74,177	42,492	+75
Other contractors	168	156	+ 8	16,536	13,316	+24
By Size of Liability						
Under $25,000	1,180	1,064	+11	13,296	11,883	+12
$25,000 to $99,999	991	739	+34	48,040	35,014	+37
$100,000 and over	436	261	+67	140,033	74,986	+87
By Region*						
New England	105	131	−20	7,610	7,212	+ 6
Middle Atlantic	498	448	+11	36,067	24,115	+50
South	446	295	+51	25,133	20,150	+25
Middle West	638	474	+35	40,048	26,412	+52
Miss. River to Rockies	316	227	+39	23,565	16,299	+45
Far West	604	489	+24	68,946	27,695	+149

*ENR regions approximated by combining Federal Reserve Districts of original data.

Road Awards Up in Three Areas

Highway and bridge contracts soared in three regions of the U. S. last year—up 61% to $818.7 million in the Middle Atlantic; 57% to $658 million in the Far West; 29% to $820.3 million in the Middle West.

A more moderate gain of 7% was registered in the Mississippi-to-the-Rockies with volume of $976.8 million. The rise in this region came despite a 10% cut in the key state of Texas.

Contract volume dropped 26% to $154.2 million in New England and 2% to $753.6 million in the South.

The over-all increase of 21% to $4.2 billion in the 50 states came close to hitting the 26% jump in volume planned by state highway departments alone. (ENR volume includes contracts awarded by county and municipal governments as well as state governments.) State highway departments said they planned to award $4.2 billion worth of highway and bridge contracts in 1960 (ENR Apr. 21, 1960, p. 34).

In about three-quarters of the states, the trend in total highway and bridge awards reported by ENR followed the direction forecast by the state highway departments. State work supplies the bulk of the total.

But contract, volume actually let upset the forecasts for several states. Volume rose in Indiana, Illinois and South Dakota, where plans had pointed to a drop in 1960.

In several other states, awards dropped instead of increasing as forecast. Massachusetts was an extreme example. Its volume skidded 15% to $66.9 million. State highway contracting plans, however, had called for a 93% increase over 1959 to a total of $175 million. The U. S. Bureau of Public Roads withheld federal-aid funds for most of the year because of alleged irregularities within the Massachusetts Public Works Department, and although federal funds were released at the end of the summer, volume failed to catch up with that of 1959.

New Hampshire's volume fell 1% to $16.4 million, compared to a planned increase of 18%, which would have put 1960's total at $2.3 million.

Delaware's awards sagged 31% to $6.1 million—the highway department had planned to lift contract volume 91% to $17.2 million.

States in the Mississippi-to-the-Rockies region scored the best forecasting record for 1960. Only South Dakota was wrong in the anticipated trend—it expected a 14% drop in award volume to a total of $30.5 million, but contracts slumped 33% to $27.7 million. Texas' 10% decline was the amount anticipated in its report to ENR.

Except for Idaho and Utah, both of which were far short of plans, states in the Far West scored substantial gains, as they had anticipated.

Bid Depository OK'd in Virginia

A four-hour bid depository plan and a code for ethical practice and procedure is getting under way in the Alexandria, Va., area.

The depository plan and code has been submitted to about 100 contractors in the region. Thirty-one, including seven general contractors have signed the code, which includes procedures for registering bids on subcontracts and material with the agent for the bid depository.

The plan is similar to those operating in several major metropolitan areas and regions. It is aimed at halting bid-shopping and bid-peddling.

Under the system, members will submit their bids to the depository agent, Spray & Dillion Associates of Alexandria not later than six hours before the time of the bid opening. General contractors will not accept bids from subcontractors and suppliers less than four hours prior to the time of general-bid filing.

The depository agent will give all bids to the successful low general contractor the day after the bid opening, or as soon as the low bidder has been determined.

Spray & Dillion Associates are also bid depository agents for the Northern Virginia Electrical Contractors, a group that established the depository system in April 1960.

Meanwhile, the Seattle-Northwest Chapter of the Associated General Contractors is moving in the direction of a bid depository. A proposal under consideration calls for the general contractor to receive all electrical and mechanical bids four hours in advance of the opening of the general contract bids. Electrical and mechanical subcontractors would be awarded immediately after award of the general contract.

The chapter resolution applies only to private construction. However, the chapter hopes to persuade public awarding authorities to adopt the practice.

Big Renewal Plans

Developments announced for Miami and Chicago

Contractors and architects in Miami and Chicago got a tempting glimpse of millions of dollars worth of building jobs last week with the unveiling of two major development plans.

Planners for metropolitan Miami hung a $660-million price tage on the 25-year development plan for the area.

The plan is aimed at halting property decay and a decline in business activity in the central city, according to Dade County's Metro planner, Paul Watt.

The cost estimate includes such area-wide projects as the Dade County expressway system and Dodge Island Port.

Cost of the expressway system is placed at $250 million. A limited-access highway around the business district, included in the over-all plan, would cost another $17 million.

The Dodge Island phase is expected to cost $20 million.

Other plans and costs are:

- Parking garages and lots served by a mass transit terminal for buses to and from the central business district, $37 million.
- Government buildings center, $14 million.

Private investment and urban renewal are expected to involve outlays of $400 million.

Newest and most ambitious building project for Chicago's downtown area is a proposed office building-hotel-apartment complex that will utilize air-rights of the Illinois Central Railroad.

The $185-million development project—to be financed by Texas interests—will occupy a six-block area north of Randolph St., east of Michigan Ave., near the 40-story Prudential building completed in 1954. Construction is expected to get under way in 18 months to two years.

Although the architects have not been selected, planners of the project envision a 60-story office building as the dominant structure. A 25- to 30-story hotel is also being considered, as well as high rise apartment buildings and possibly other office buildings. Off-street parking may also be provided for 4,000 cars.

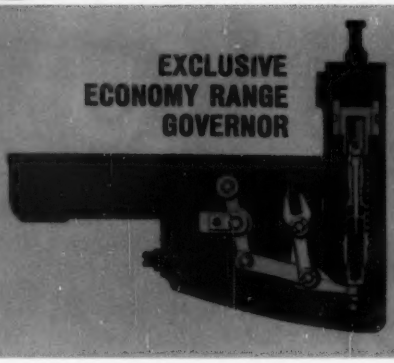
Air-rights are expected to cost about $35 million, while the costs of design, development and construction may come to $150 million.

The development will be called "Illinois Center."

GMC V-
DIESEL

You get rugged, compact
more inside cab roor
short BBC dimensions—
carry bonus payloads
smoother power,

EXCLUSIVE ECONOMY RANGE GOVERNOR



Only G
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top fuel
longer
Standar
on 4-wh

● **Greatest combustion efficiency with maximum air performance than naturally aspirated engines ● Sa exclusive automatic hydraulic fan ● Four exhaust complete exhaust scavenging, give a cooler-runnin plete fuel combustion ● Replaceable dry-type cyl**

From ½-ton to 60-ton
General Motors leads the way!

THE TRUCK TRIUMPHS OF THE 60's!

GMC
GENERAL MOTORS CORPORATION
TRUCKS

GMC Truck & Coach—a General Motors Division—Pontiac, Michigan

218 hp. V-6 Diesel Engi
Out In The Open with th
Other features of GMC st
are: 72″ BBC and 52″ fron
tion for big loads; biggest a
you can get; sharper turn
job-matched diesel power
lbs. GVW to 76,800 lbs. GC

GMC's Biggest, Diese
60-ton Tractor—DBW9
with 90″ BBC and 28-inch
location for biggest legal
ventional Ninety-Inchers,
diesels, are ideally suited
struction jobs from 30,00

7-6 LS SHORTEST, LIGHTEST AND LEAST EXPENSIVE TO OWN—IN THEIR CLASS!

pact construction . . . many inches shorter for room, simpler servicing and full advantage of ns—lightest weight, up to 530 pounds less, to oads—two-cycle design for faster acceleration, wer, exceptional fuel economy and added life.

nly GMC diesels ve this economy nge governor that sitively regulates gine speed at the st efficient rpm for p fuel economy and nger engine life. andard equipment 4-wheelers.

BIG PULLING POWER!
HIGH PERFORMANCE!
6V-71 GMC TRUCK DIESELS

MAX. TORQUE
604 @ 1200

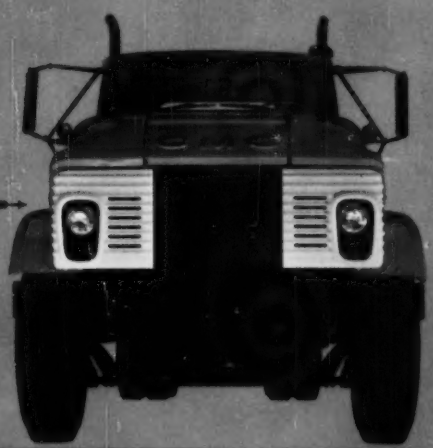
MAX. HORSEPOWER
197 @ 1800
to
218 @ 2100

Ratings are at sea level and 60°F.

m air intake from Roots-type blower ● Better high-altitude ● Save up to 5% on fuel, get up to 12 extra horsepower with haust valves for each cylinder (not just 1 or 2) assure more unning engine, lengthen valve life and provide more com- e cylinder liners are leak-proof, quick and easy to service.

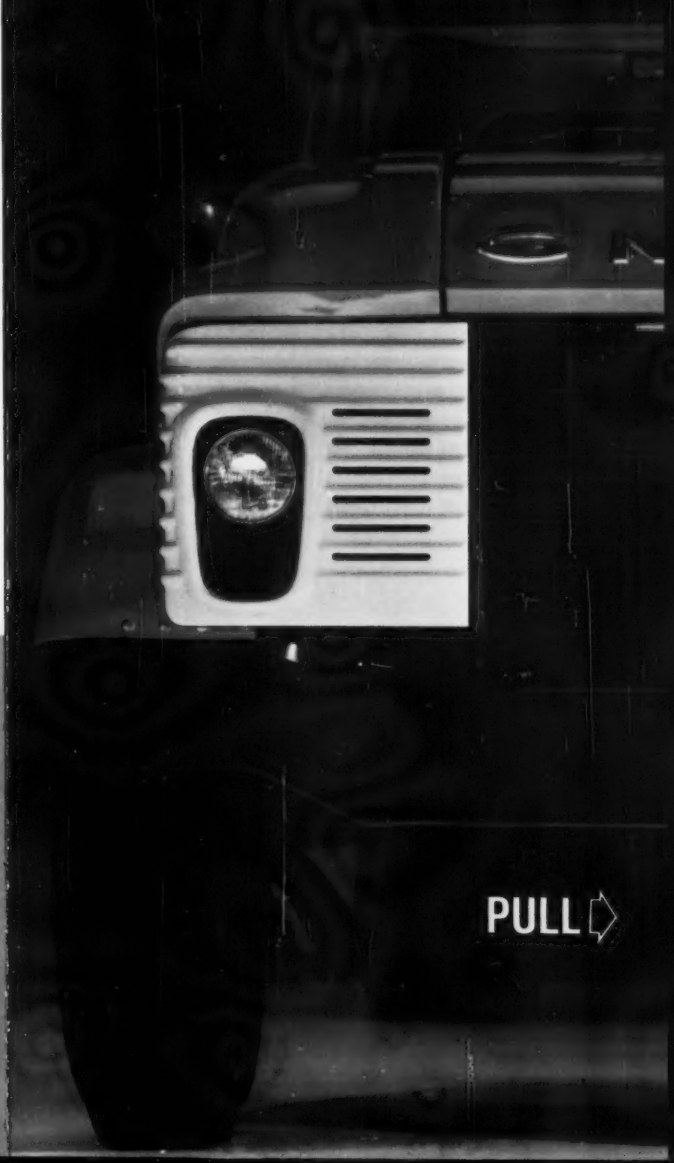
Engine Is Right
th the cab tilted. IC steel tilt-cabs ' front axle loca- gest safety vision turning angles; ower from 32,000 s. GCW.

Diesel-Powered
DBW9000 Series 3-inch front axle egal loads. Con- hers, with V-6 uited to all con- 0,000 lbs. GVW.



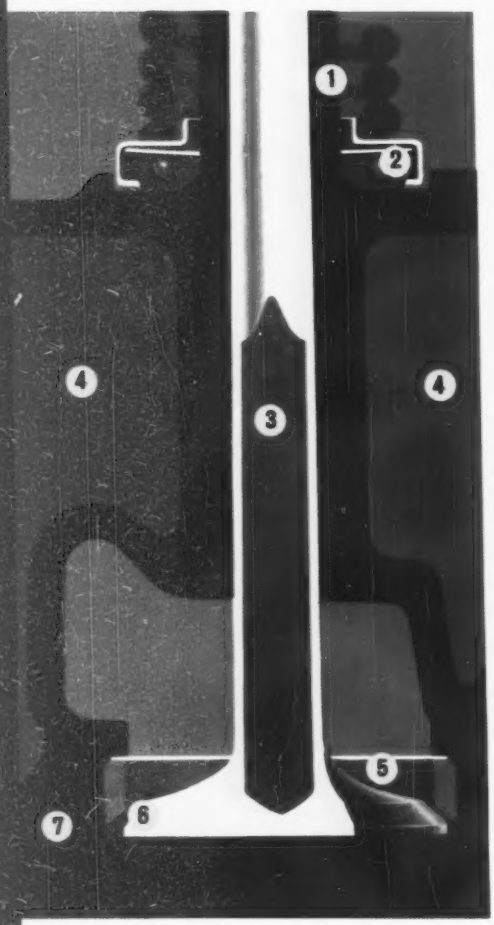
POWER REASONS

WHY GMCs ARE THE MOST ADVANCED CONSTRUCTION TRUCKS IN 20 YEARS



EXCLUSIVE GMC ENGINES ARE BUILT TO

Short, Stout Design! Low-Rpm Power! GMC V-6s have exclusive long-life strength. Deep-skirted block has extra-reinforcing ribs and structural superiority throughout. Full-power at low engine speed and shortest stroke of any comparable truck-built engines reduce power-robbing wear, add to greater fuel economy and provide the desired, higher performance.



Cooler-Running, Stronger, Bigger Valves...Everything For Longer Life!

1 Extra-long valve guides, integral with head, minimize stem exposure to burning gases and assure faster transfer of heat. **2** Positive rotation of both intake and exhaust valves (except 305A) give valves self-cleaning action to prevent sticking, pitting, warping, leaking and burning. **3** Valve stems are short and big diameter to practically eliminate distortion. Sodium-filled exhaust valves* more rapidly transmit damaging heat through the valve guides to the coolant. **4** Up to 176 gallons of coolant circulating every minute (over twice as much as many competitive engines) provide the flow necessary for life-prolonging heat transfer. **5** Hard, tough, special steel is used in the exhaust valve seat inserts of heavy-duty V-6 engines to withstand high temperatures and constant seating action. **6** Valve heads and ports are extremely large for better breathing. Special hard facing resists pitting, corrosion, fatigue and wear. **7** Wide bridge between valves provides added strength and big cooling areas for better heat dissipation. *(Except 305s)

HERE'S YOUR COMPLETE CHOICE OF EXCLUSIVE GMC V-6 GAS ENGINES		
MODEL	GROSS TORQUE RANGE	MAX. HP.
305A	258-260 @ 1400-2200	150 @ 3600
305B	264-266 @ 1100-2000	150 @ 3600
305C & D	268-270 @ 1200-2100	165 @ 3800
351	308-312 @ 1400-2400	180 @ 3400
401	375-377 @ 1200-2000	210 @ 3400

Lower Maintenance Costs! Adjustments, repairs and replacements are easier and less costly with GMC engines. For example—spark plugs are conveniently located inside the V. Self-locking screws make valve lash adjustments a simple job. Most major parts are interchangeable between V-6 engine models, and several with Twin-Six engines. Expert service and all parts are readily available at GMC Truck Dealers located across the country.

Low Buying Cost! Low Owning Cost! That's the new GMC 105" BBC Conventional 6-wheelers with 105" BBC cab, 351 or 401 V-6s. Servicing is convenient with wide hood and roomy engine compartment. Easy-in-and-out conventional cab trucks start with choice of 34 pickup combinations and go up to 60,000 lbs. GCW tractors.

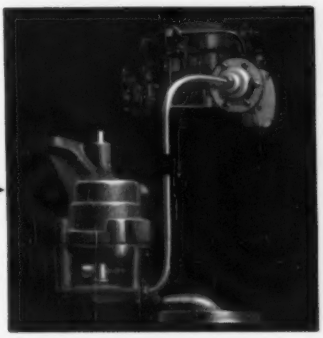
Out-Earns, Out-Pulls All Trucks In Its Class . . . GMC steel tilt-cabs with exclusive 275 hp. Twin-Six. These easy-to-service, easy-to-drive models with 72" BBC and 52" front axle placement are also available with GMC V-6 engines. Full line, 19,500 lbs. GVW to 76,800 lbs. GCW, cannot be surpassed on any construction haul.

FOR ALL THE PROFIT-FACTS, CONTACT YOUR GMC DEALER LISTED IN THE YELLOW PAGES OR VISIT

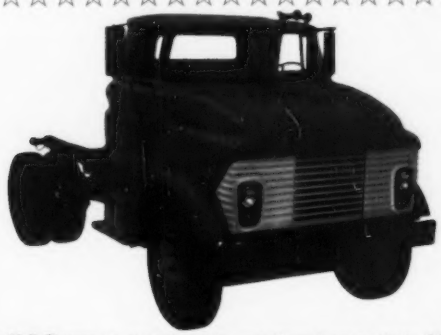
UT-LAST, OUT-POWER OTHER GAS ENGINES!

Greatest Pulling Power Of All! This 702 cu. in. Twin-Six gas engine produces the most usable power of any standard equipment engine. You get great reserve power at low engine speed to haul loads at part throttle under normal conditions . . . using reserve only for hills. You save fuel, reduce shifting up to 60% and get longer engine life.

Notice The Full 3-Inch Extended GMC Skirt for the most rigid, full crankshaft support. New compact design, extra strong inner ribbing and staggered cylinders all increase strength and rigidity, decrease costly wear and failures.



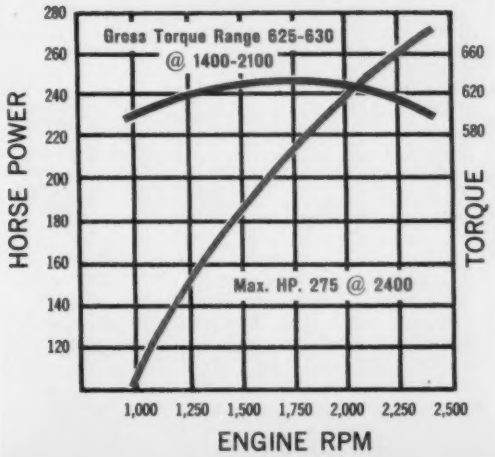
Tamper-Proof, Positive Speed Control Governor! This GMC patented hydraulic governor operates by direct oil pump pressure to accurately, reliably control proper operating speeds . . . adds to engine life. Standard on 401 and 702 engines.



Exclusive V-6 Power is standard in medium-heavy duty 90" Conventionals along with easy-driving independent front suspension and easy-riding vari-rate rear springs on 4-wheel models. Ruggedly reinforced cabs with double-walls stand up on the roughest construction jobs. Heavy-duty models have the powerful Twin-Six.

SIT ANY CONTRACTORS USING NEW GMC TRUCKS.

EXCLUSIVE, HIGH-PERFORMANCE GMC TWIN-SIX



Goldberg Gets Bargaining Going

The new Secretary of Labor, Arthur J. Goldberg, spent his first hours in office tinkering with a failure in labor contract negotiations.

His efforts, which proved successful last week, did not foreshadow more federal interference, but resulted, instead, in another reprieve for free collective bargaining.

Soon after taking the oath of office, Mr. Goldberg moved in on a maritime strike that had been fanning out from the harbor of New York City through the railroads with paralyzing effects for nearly two weeks.

His presence among the negotiators hastened a settlement and helped to dramatize the three big issues that emerged from the strike—management's right to manage, picketing and boycotts, and government intervention to protect the public in labor disputes.

Directly involved in the strike were 660 men who work on tugs, ferryboats, barges and lighters operated in New York harbor by 12 carriers, including 11 railroads. The men are members of three maritime unions.

The big issue in the strike was whether management has or should be allowed to exercise the right to reduce the size of the present five-man crews.

Basically, the job-protection issue is the same one the construction industry now faces with the elevator constructors, although there the specific question is management's exercise of the right to fabricate and assemble off the job site.

The harbor strike reached critical proportions when strategically placed picket lines were honored by members of the railroad unions, substantially halting the eastern rail and freight operations of the big New York Central and New Haven railroads.

Mr. Goldberg entered the picture on the invitation of New York's Gov. Nelson A. Rockefeller. The strike was settled on January 23—the day after the Goldberg entrance. But, as in the case of the long elevator constructors' strike in New York City last summer, the solution to the strike issue was merely postponed.

The unions and the employers in the harbor strike voluntarily agreed to let the manpower issue ride until they have the benefit of the report and recommendations of the committee recently appointed by former President Eisenhower to study the work rules issue in the railroad industry. The report is due in December. Former Secretary of Labor James P. Mitchell agreed to broaden the "featherbedding" inquiry to include the issue in the harbor dispute.

LABOR SECRETARY moved into tug-strike at invitation of Governor Rockefeller.

There is no guarantee that the truce will end in a peaceful solution of the job protection issue. But it at least gains time for a more objective look at the interrelated problems of the right to manage, job protection and work rules.

In addition to underlining the growing significance of the "right to manage" issue in labor relations generally, the strike produced new calls for congressional tightening of the boycott ban and for new legislation to prevent strikes that victimize the public.

The "outrage" that was commonly cited was the fact that so few could injure so many in a "public be damned" approach to a labor dispute. One of the immediate results may be more hesitancy on the part of Congress to move the situs picketing bill, which would ease the boycott restrictions, at least in the construction industry.

Although Mr. Goldberg's presence in the negotiations resulted from reportedly heavy pressure on the White House for government intervention, neither Mr. Goldberg's participation nor the results suggest the beginnings of a "big stick" pattern.

In the past, Mr. Goldberg has said repetition of the last steel strike "cannot be permitted." He has called the Taft-Hartley emergency strike procedures "wholly unsatisfactory." He has denounced compulsory arbitration. Instead of further government controls, his theme has been more intelligent labor-management cooperation to forestall such control and to keep the bargaining process free and voluntary.

With that end in mind, Mr. Goldberg has previously urged formation of a national council of labor-management advisers through which top-notch members of labor, management and the public can help—but not dictate—in the resolution of labor-management issues. Suspension of the strike over the manpower issue in the New York harbor dispute and the interim use of the Mitchell study committee parallel that approach.

California Carpenters Seek Shorter Workweek

Carpenters in 48 local unions in 11 southern California counties last month requested that their labor contract be reopened for negotiation of a four-day workweek without any loss in take-home pay.

Reason given for the move is that unemployment is so severe among southern California's 55,000 carpenters that a shorter workweek is needed to spread available jobs among more men.

The carpenters are now working a five-day, 40-hour week. Their master contract runs until May 1, 1962.

The demand was under discussion last week by representatives of the carpenters and the Associated General Contractors.

Federation of Engineer Unions to Fold

End of Engineers and Scientists of America is attributed to financial and internal problems

The only national federation of independent unions for professional engineers is in the process of dissolution.

It is Engineers and Scientists of America, which has played a dominant role in the history of engineering unionism for the last eight years.

ESA president Joseph Amann indicated last week that the dissolution should be completed about the end of March, when the federation's final report is filed under the Landrum-Griffin labor law with the Labor Department's Bureau of Labor-Management Reports. ESA, meanwhile, is keeping its Washington office in operation on a limited basis.

Mr. Amann said the dissolution of ESA neither means nor suggests that unionism and professionalism are incompatible. With the right leadership, structure, attitude, approach and financing, he explained, there is no reason why the unionization of professional workers cannot move forward successfully.

Resort to AFL-CIO affiliation as a means of promoting and strengthening the union movement of engineers and technicians was viewed by Mr. Amann as a "temporary expedient." Mr. Amann said he doubts that the AFL-CIO approach is "philosophically correct for engineers." Rather, he said, the future of the movement lies in an independent organization that represents engineers, technicians, and perhaps the apprenticeable trades. Such an approach he observed, would unite under a national banner those that have close common interests, and would give the bargaining power of the union members some real significance.

ESA's immediate trouble, Mr. Amann said, was simply that "there wasn't enough income to go forward in the face of rather difficult circumstances." Mr. Amann said members had become apathetic with the achievement of some of their goals but suggested that the basic problem was a failure in direction and structure.

He said the big "mistake" occurred in 1957, when ESA became a super-professional organization and forced from its ranks those affiliates that represented nonprofessional as well as professional workers. As a result of that move, ESA's membership was cut nearly in half and the federation was left with six affiliates with a total membership of 17,900.

ESA, founded in 1952, claimed a coast-to-coast membership of 31,287 in 1956 with 8.1% of the members reported as civil engineers.

Some of the affiliates that spun off from ESA tried unsuccessfully to form a new national federation of independent unions representing professionals and nonprofessionals. The proposed organization was Engineers and Scientists Guild. A number of the pre-1957 ESA members have joined AFL-CIO unions. Among the latest to do so was Sperry Gyroscope's Engineers Association, headed by Charles Hall, who served as provisional president of ESG.

Part of ESA's difficulties—and one that played a role in the 1957 emasculation—was that of personality conflicts and disunity in ESA leadership, according to Mr. Amann. Aware of the danger of "too many cooks," he said he feels that any organization that moves into the vacuum left by ESA's dissolution must, unlike ESA, be strongly centralized.

Labor in Brief . . .

• **Situs picketing**—A clause requiring a 10-day notice of intention to strike at military and missile construction projects has been included in a situs picketing bill introduced by Frank Thompson (D., N. J.). The bill, H. R. 2955, reportedly has the approval of the Kennedy Administration and is otherwise similar to the bill introduced by President Kennedy last year.

• **Over the $5.00 mark**—Journeymen plumbers in Alameda County (Oakland), Calif., will be getting $5.26 an hour next January under a new 18-month labor contract that spreads a 52½-cent raise over the contract period. Increase is payable in installments of 25, 10 and 17½ cents, with 2½ cents of the last one earmarked for an industry promotion fund.

• **National agreements**—At its 43rd Annual Meeting in Ottawa last week, the Canadian Construction Association reaffirmed the autonomy of its member associations in collective bargaining and opposed all national labor contracts that conflict with locally negotiated agreements.

• **Hot-cargo**—In an effort to beat the Landrum-Griffin labor law's ban on hot-cargo clauses, the teamsters union has negotiated a clause in which employers agree not to penalize teamsters who refuse to handle goods of an employer engaged in a labor dispute. The new clause appears in three-year contracts reached with trucking companies in 13 states.

• **Three-year contracts**—New three-year labor contracts have been negotiated by the Arkansas Chapter of Associated General Contractors and the carpenters and operating engineers unions in Little Rock. Carpenters will get a 30-cent wage increase payable in installments of 10, 5, 5, and 10 cents. Most engineers will receive 30 cents in three, 10-cent installments, with some classifications getting an additional 5 cents.

• **Foreign competition**—The Rochester, N. Y., local of the International Brotherhood of Electrical Workers may refuse to install electronic products from Japan and other low-wage nations. The union's business agent said members of the local who handle electronic products could be adversely affected by Japanese imports.

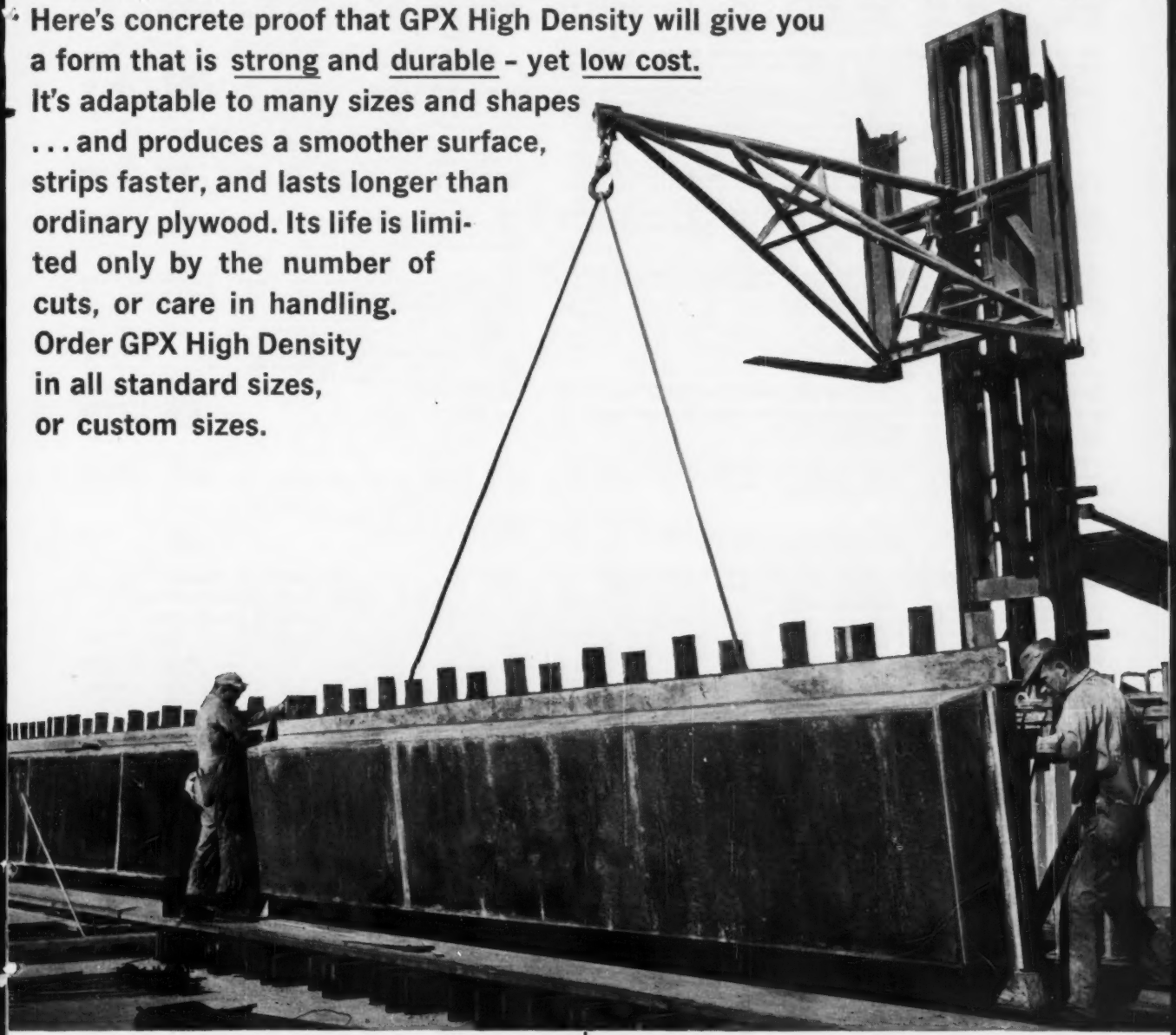
• **EA gets a hearing**—As a result of an order issued last month by the general counsel of the National Labor Relations Board, Engineers Association at Sperry Gyroscope Co. will get a full hearing on its charge that Sperry unlawfully interfered in the certification election it lost in September. The association has been active in the engineering union movement.

• **Donahue appointed**—Charles Donahue, research director of the plumbers union, has been appointed solicitor of the U. S. Department of Labor. Mr. Donahue, a lawyer, was an assistant solicitor in the Roosevelt and Truman administrations.

GPX® HIGH DENSITY overlaid plywood does job of pre-stressed concrete steel forms at lower cost; vibrated 6,000 rpm

High density overlaid plywood was used by the Washington State Highway Department to cast ninety-foot, pre-stressed concrete beams for a bridge in western Washington. Forms were vibrated 3,000 to 6,000 rpm, and stripped in 24 hours. Results? Strong, smooth concrete beams at lower form-cost. And with forms in good condition, ready to be used again or cut to any size required for the next job.

Here's concrete proof that GPX High Density will give you a form that is strong and durable - yet low cost. It's adaptable to many sizes and shapes ... and produces a smoother surface, strips faster, and lasts longer than ordinary plywood. Its life is limited only by the number of cuts, or care in handling. Order GPX High Density in all standard sizes, or custom sizes.



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Plywood • Hardboard • Lumber • Redwood • Pulp • Paper • Chemicals

Georgia-Pacific, Dept. ENR-261, Equitable Building, Portland, Oregon
Please send sample of GPX High Density,
with detailed information and nearest local source.

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ADDRESS_____

CITY_____ COUNTY_____ STATE_____

OFFICIAL PROPOSALS

Bids: February 23, 1961.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and Canal Law and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 23rd day of February 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 2, L. KETCHUM, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Madison	M 61-1	Village of Canastota: Peterboro St.-West Old Erie Canal	0.04	Enclosing A Portion of The Old Erie Canal	$4,000 Plans $5	$71,000
Montgomery	US 107	Village of Fort Plain: Lock 15E—Erie Canal	....	Replacing Lock Gates and Sills	5% of Bid Plans $10	Confidential
Oneida (Rte. 69)	FARC 61-14	Camden Taberg, Pt. 2, S.H. 5139; Thomson Corners-Taberg, S.H. 1158; Rome-Taberg, S.H. 563 Project F-635(6), S-597(1) and U-635(6)	6.41	Cem. Conc. Pavt.= 6.01 Mi.; Asph. Conc. Ty. 1 = 0.40 Mi.; Prestressed Conc. Beam Bridge 5 Sps., 343.9′ Tot.	$120,000 Plans $5	2,190,000
DISTRICT No. 4, B. F. PERRY, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Monroe	M 61-4	City of Rochester: Sector Gate 2 Court St. Dam on Genesee River	....	Cleaning & Painting Sector Gate 2	$400 Plans $5	7,600
Monroe (Int. Trg. Rte. 490)	FISH 61-6 FASH 61-7	Interstate Rte. Connection 580 Rochester Western Expressway (Buffalo Road to Howard Road) Elm Grove Rd. Connection Project I-IG-490-2(21); U-783(6)	3.08 (5.04 Acc.)	9″ Cem. Conc. Pavt. 2 @ 24′= 2.88 Mi.; Asph. Conc. Ty. 1A = 0.04 Mi.; Misc. Work = 0.16 Mi.; Access = 4.15 Mi., Cem. Conc. Pavt.; 0.86 Mi. Asph. Conc. Pavt. Type 1A; 0.03 Mi. Misc. Work; 8 H.G.S. Comp. I-Beam; 4 Sps. 186.8′ Tot.; 4 Sps. 186.8′ Tot.; 3 Sps. 179′ Tot.; 3 Sps. 171′ Tot.; 3 Sps. 195.8′ Tot.; 3 Sps. 133.5′ Tot.; 3 Sps. 159.7′ Tot.; 3 Sps. 202.3′ Tot.	$240,000 Plans $10	4,375,000
Monroe & Orleans	M 61-2	City of Rochester: West Guard Lock Bridge E-186, Orrs, Over Erie Barge Caal	....	Cleaning & Paint. Structural Steel on West Guard Lock; Cleaning & Painting Bridge	$500 Plans $5	9,300
DISTRICT No. 6, WM. J. DENNIS, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Steuben (Rte. 15 & 371)	FARC 61-1	Cohocton-Wayland, Pt. 1 S.H. 1104; Avoca-Wallace-Cohocton, S.H. 5564; Cohocton-Naples, Pt. 1, S.H. 5611 Project F-627(12); S-523(1)	1.52	8″ Cem. Conc. Pavt. 24′= 1.32 Mi. Asph. Conc.= 0.17 Mi. Misc. Work = 0.03 Mi.	$35,000 Plans $5	653,000
DISTRICT No. 7, R. W. SWEET, District Engineer, 444 Van Duzee Street, Watertown, New York						
Clinton (Int. Trg. Rte. 87)	FISH 61-5	Interstate Route 502 Sections 7A3, 7A4, 7A5 (Route 22 to Salmon River Rd.) Project I-IG-87-4(11)	9.08 (3.44 Acc.)	Asph. Conc. Ty. 1A = 8.96 Mi.; Asph. Conc. Type 1A (Access) = 3.44 Mi. Misc. Work = 0.12 Mi.; H.G.S.S. Twin 3 Span Prestressed Conc. Br.; 2 Sps. @ 42.7′; 2 Sps. @ 41.6′; 2 Sps. @ 39.2′ H.G.S.S. Twin; 3 Sps. Prestressed Conc. Br.; 2 Sps. @ 41.2′; 2 Sps. @ 42.4′; 2 Sps. @ 42.3′; Twin 2 Span Comp. WF Beam Br. 4 Sps. @ 57′; Prestressed Conc. Br. 5 Sps. 254.7′ Tot.; R.R.G.S. Twin 3 Span Comp. WF Br. 6 Sps. @ 82.1′; Prestressed Conc. Br.5 Sps. 295.4′ Tot.	$390,000 Plans $10	6,679,000
Clinton	S.H. 61-4	Twin Bridges Road (Interstate Route 87 to US Route 9)	0.52	Asph. Concrete Type 1A	$9,000 Plans $5	63,000
Jefferson (Int. Trg. Rte. 81)	FITS 61-7	Interstate Rte. 505 (Section 7AB-1) (Pierrepont Manor to Oswego County Line) Project I-81-3(21)	4.60 (6.88 Acc.	Traffic Signs	$2,200 Plans $5	40,000
DISTRICT No. 8, K. G. RAUER, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Westchester (Rte. 9)	FARC 61-15	Croton River-Peekskill, S.H. 657, Croton-on-Hudson Village: Riverside Ave., S.H. 1207	2.75 (2.71 Acc.)	9″ Cem. Conc. Pavt.= 2.54 Mi.; Misc. Work = 0.21 Mi.; Access = 2.26 Mi. Cem. Conc. Pavement and 0.45 Mi. Bit. Double Surface Treatment; 2 H.G.S. Comp. Gird. 3 Sps. 184.81′ Tot.; 4 Sps. 238.86′ Tot.; Ped Overpass I-Beam, 4 Sps. 213.92′ Tot.	$265,000 Plans $5	4,852,000
Westchester (Rte. 9)	T.S. 61-2	Broadway-Hastings-Dobbs Ferry-Mt. Pleasant-Tarrytown-No. Tarrytown, S.H. 9206	0.59	Traffic Signs and Delineators	$1,300 Plans $5	24,000
DISTRICT No. 10, A. M. SARR, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Nassau	FAWOBE 61-1	Wantagh-Oyster Bay Expressway, Cont. 2 (Hempstead Turnpike-Old Country Road) Project U-UG-1110(3)	3.29 (3.58 Acc.)	9″ Cem. Conc. Pavt. with Carbon Black = 3.09 Mi.; Misc. Work = 0.20 Mi.; Access = 1.90 Mi. Cem. Conc. Pavt. and 1.68 Mi. Asph. Conc. Pavt.; 5 H.G.S. Comp. W.F. Beam; 2 Sps. 142.2′ Tot.; 2 Sps. 146.5′ Tot.; 2 Sps. 115.2′ Tot.; 1 Sp. 76.3′ Tot.; 1 Sp. 57.8′ Tot.; 2 R.R.G.S. Steel Girder; 2 Sps. 138′ Tot.; 1 Sp. 104′	$330,000 Plans $10	6,001,000
Nassau (Rte. 106)	R.C. 61-11	Jericho-Oyster Bay, S.H. 9021	0.17	Misc. Drainage Work	$7,000 Plans $5	122,000
Nassau & Suffolk	NSP 61-1 SAGSP 61-1 SMSP 61-1	Northern State Parkway Sagtikos State Parkway Sunken Meadow State Parkway	27.26	Roadside Development, Drainage, Misc. Work	$15,000 Plans $5	280,000
Nassau & Suffolk	SSP 61-1	Southern State Parkway	5.82	Landscaping	$7,000 Plans $5	131,000
Suffolk (Rte. 27)	T.S. 61-8	Sunrise Highway Extension FASH 59-13 (S.H. 1883 to Springdale Road	3.98 (5.39 Acc.)	Traffic Signs and Delineators	$1,700 Plans $5	30,000
Suffolk (Rte. 114)	R.C. 61-12	Sag Harbor-Easthampton, S.H. 846	5.29	Asphalt Concrete	$42,000 Plans $5	776,000
Suffolk (Rte. 25A)	R.C. 61-16 FASS 61-1	Smithtown-Port Jefferson, S.H. 5232A, Elimination of Grades of The Long Island R. R. and Nicolls Road (C.R. 97) Project SG-571(1)	1.67	9″ Cem. Conc. Pavt.= 1.10 Mi.; Misc. Work = 0.26 Mi. Cem. Conc. Pavt. with Carb. Black = 0.07 Mi.; Asph. Conc.= 0.24 Incl. R.R.G.S.—Thru Plate Girder; 2 Sps. 127.5′ Tot.	$70,000 Plans $5	1,295,000
Suffolk	FIIB 61-1	Fire Island Inlet Bridge (Captree State Park to Fire Island State Park) Contract No. 1, Substructure	0.87	Bridge Substructure Comprising 2 Abutments and 26 Piers; 4,232.7′ Total	$150,000 Plans $5	2,760,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: February 10, 1961

Contract Spec. No. FA-SM-178

NOTICE TO CONTRACTORS
STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m., Eastern Standard Time, on February 10, 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for:

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON INTERSTATE ROUTE 505, CLINTON STREET TO FORMAN AVENUE, NEW PROJECT NUMBER I-81-2 (25)83, OLD PROJECT NUMBER I-1127 (11), ONONDAGA COUNTY, WHICH CONSTITUTES CONTRACT SPEC. NO. FA-SM-178. (City of Syracuse)

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.
(b) Mr. Earl E. Towlson, District Engineer, New York State Department of Public Works, 333 East Washington Street, Syracuse, New York.
(c) Mr. William Mende, Principal Building Construction Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. Refunds of deposits for plans, specifications and proposals will be made *only* in case the deposits of individual sets are $10.00 or more, per Chapter 835, Laws of 1960.
The Engineer's Estimate of cost for this work is $51,087.50.
Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $3,000.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law as set forth in "Instruction to Bidders".
The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF
PUBLIC WORKS

Bids: May, 1961

Kingdom of Thailand
Royal Irrigation Department
Bangkok, Thailand

INVITATION FOR BIDS — NO. YS-3-4A
The Royal Irrigation Department of the Kingdom of Thailand hereby invites sealed written bids for furnishing and delivering the following goods, equipment, and materials either fob Contractor's shipping point or cif Bangkok Wharf, Thailand, for the Transmission System, Yanhee Multipurpose Project, Kingdom of Thailand, in accordance with the Contract Documents, for furnishing:

1) Five (5) power transformers, each 2,000 kva, three phase, Class OA, 50 cycle, outdoor, 69-12 kv, complete with lightning arresters.
2) Six (6) power transformers, each 4,000 kva, three phase, Class OA, 50 cycle, outdoor, 69-12 kv, complete with lightning arresters.

Invitation for Bids will be issued in February, 1961, and will be opened in May, 1961. Copies of Contract Documents, Invitation for Bids—No. YS-3-4A, 69 KV Power Transformers, may be obtained by qualified Bidders on written request to:

Royal Irrigation Department
Attention: Thai Liaison Engineer
c/o Engineering Consultants, Inc.
1901 South Navajo Street
Denver 23, Colorado, U.S.A.

Each request must be accompanied by a check or money order, payable to the Royal Irrigation Department, in the amount of U.S. $25.00 for each copy of the Contract Documents requested. The remittance is nonreturnable.

M. L. Xujati Kambhu
Director General
Royal Irrigation Department
Kingdom of Thailand
Bangkok, Thailand
January 19, 1961

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5489) will be received at Lewiston, California, until 2 p.m., Pacific Standard Time, February 21, 1961, for furnishing labor and materials for River Channel Improvement at Trinity Dam, Trinity Diver Division, California, Central Valley Project. Location on Trinity River, immediately downstream from Trinity Dam, in Trinity County, California. Principal items are 71,000 cu. yds. excavation; and other work. Completion time 100 days. For particulars, address Bureau of Reclamation, P. O. Box 2511, Sacramento, California; P. O. Box 247, Lewiston, California, or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5482) will be received at White City, Oregon, until 10 a.m., Pacific Standard Time, March 7, 1961, for furnishing labor and materials for Earthwork and Structures for West Lateral Rehabilitation and West Lateral Extension, Talent Division, Oregon, Rogue River Basin Project. Location near Medford, Oregon in Jackson County. Principal items are Excavation—254,000 cu. yds.; Concrete—1,200 cu. yds.; Concrete Pipe—6,000 lin. ft.; and other work. Completion time 400 days. For particulars, address Bureau of Reclamation, P. O. Box 386, White City, Oregon; P. O. Box 937, Boise, Idaho; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5479) will be received at Huron, South Dakota, until 10 a.m. Central Standard Time, March 7, 1961, for furnishing labor and materials for Stage 08 and 09 Additions to Watertown Substation, Transmission Division, South Dakota, Missouri River Basin Project. Location Watertown, South Dakota. Principal items are 230 cu. yds. concrete; 132,000 pounds—furnishing and erecting structural steel; 3 breakers—installing 230-kilovolt, 1,200-ampere, 5,000-mva, power circuit breakers; and other work. Completion time 435 days. For particulars, address Bureau of Reclamation, P. O. Box 2553, Billings, Montana; P. O. Box 825, Huron, South Dakota; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSALS

Bids: February 10, 1961

Contract Spec. No. FA-SM-179

NOTICE TO CONTRACTORS
STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m., Eastern Standard Time, on February 10, 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for:

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON INTERSTATE ROUTE 505, NEDROW TO EAST GLEN AVENUE, NEW PROJECT NUMBER I-81-2(22)77, OLD PROJECT NUMBER I-1127(6), ITEM 72B, ONONDAGA COUNTY, WHICH CONSTITUTES CONTRACT SPEC. NO. FA-SM-179.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.
(b) Mr. Earle E. Towlson, District Engineer, New York State Department of Public Works, 333 East Washington Street, Syracuse, New York.
(c) Mr. William Mende, Principal Building Construction Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. Refunds of deposits for plans, specifications and proposals will be made *only* in case the deposits of individual sets are $10.00 or more, per Chapter 835, Laws of 1960.
The Engineer's Estimate of cost for this work is $25,975.00.
Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1,500.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law as set forth in "Instruction to Bidders."
The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF
PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: See Advertisement

The Port of New York Authority

Sealed proposals for the following work will be received at the Office of the Chief Engineer, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on date indicated, at which time said proposals will be opened and read in Room 1108.

Contract BP-210.007—Brooklyn-Port Authority Piers—Pier No. 8—Dredging—Deposit $30.00 per set of documents—Bids will be received until 2:30 P.M. on Thursday, March 2, 1961.
Contract NYA-120.014—New York International Airport—Conversion of Fuel Tanks—No deposit required—Bids will be received until 2:30 P.M. on Thursday, February 16, 1961.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design, Room 1115, 111 Eighth Avenue, New York 11, N. Y. Documents will be furnished upon receipt of the above deposit (each set including one copy of the Contract Drawings) for not more than three sets to any one company. Additional sets will be furnished upon payment of an amount for each set equal to the deposit indicated above, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman
New York, February 2, 1961

District of Columbia—Bldg. Construction—Dept. of Bldgs. & Grounds, D. C., Jan. 24, 1961. CONSTRUCTION OF CATHERINE R. WATKINS ELEMENTARY SCHOOL, 12th and "E" Sts., S.E., Wash., D. C., (Invitation No. C-6178-B). (Wage rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Room 404, 499 Pa. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D. C. Treasurer. (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EST, Feb. 21, 1961, in Rm. 424, 499 Pa. Ave., N.W.

OFFICIAL PROPOSAL

RATE: $2.70 per line (or fraction) per insertion.

CLOSING DATE: 10:30 a.m. Friday for issue out following Thursday.

SEND COPY: Official Proposal Division, Engineering News-Record, P. O. Box 12, New York 36, N. Y.

U. S. Government

Department of Commerce, Bureau of Public Roads, February 2, 1961. SEALED BIDS will be received at the office of E. L. Tarwater, Division Engineer, Bureau of Public Roads, 1554 Columbia Pike, Arlington 4, Virginia, until 11:00 a.m., E.S.T., March 2, 1961, for Contract 8, Bridge Roadway Lighting, Woodrow Wilson Memorial Bridge over the Potomac River. The construction required consists of the roadway lighting system on the bridge structure and along approximately 425 feet of the west approach to the bridge, and an aerial obstruction lighting system in the vicinity of the main channel bascule span. The required construction is located partially in the City of Alexandria, Virginia, partially in the District of Columbia, and partially in Prince Georges County, Maryland. The approximate quantities of the more important items are 76 lighting standards, 76 luminaries, and 50,000 lin. ft. of multiple lighting conductor. Minimum wage rates have been fixed as required by law. Plans, specifications, and bid forms are available upon request at the address given above. F. W. Cron, Regional Engineer.

Department of Commerce, Bureau of Public Roads, February 2, 1961. SEALED BIDS will be received at the office of E. L. Tarwater, Division Engineer, Bureau of Public Roads, 1554 Columbia Pike, Arlington 4, Virginia, until 11:00 a.m., E.S.T., March 2, 1961, for Contract 9, Field Painting Metalwork, Woodrow Wilson Memorial Bridge over the Potomac River. The construction required consists of furnishing materials for and applying three coats of paint on approximately 11,000 tons of ferrous metalwork, including structural steel, machinery, electrical equipment, and other miscellaneous metalwork. The required construction is located partially in the City of Alexandria, Virginia, partially in the District of Columbia, and partially in Prince Georges County, Maryland. Minimum wage rates have been fixed as required by law. Plans, specifications, and bid forms are available upon request at the address given above. F. W. Cron, Regional Engineer.

Department of Commerce, Bureau of Public Roads, February 2, 1961. SEALED BIDS will be received at the office of E. L. Tarwater, Division Engineer, Bureau of Public Roads, 1554 Columbia Pike, Arlington 4, Virginia, until 11:00 a.m., E.S.T., March 2, 1961, for Contract 10, Bituminous Concrete Surfacing, Woodrow Wilson Memorial Bridge over the Potomac River. The construction required consists of a two-inch thick bituminous concrete surface course on the west and east approach spans of the bridge having lengths of 2,310 and 3,350 feet respectively. The required construction is located partially in the City of Alexandria, Virginia, partially in the District of Columbia, and partially in Prince Georges County, Maryland. The approximate quantities of the items involved are 5,400 tons of hot bituminous concrete surfacing, 10,000 gals. of liquid water-gas tar or coal tar, and 4,900 gals. of coal tar pitch. Minimum wage rates have been fixed as required by law. Plans, specifications, and bid forms are available upon request at the address given above. F. W. Cron, Regional Engineer.

OFFICIAL PROPOSALS

Bids: February 15, 1961

Indus Basin Project

West Pakistan Water and Power Development Authority
ADVANCE NOTICE
OF
INTENT TO INVITE TENDERS
FOR THE
PRODUCTION OF SAND AND AGGREGATES AND RIPRAP

In connection with the construction of a number of large canals and several barrages to be undertaken as part of the Indus Basin Project in West Pakistan, the above Authority intends to call for tenders for the production, in West Pakistan, of sand and aggregates for concrete and stone for riprap and revetments. The work will be carried out under the Indus Basin Development Fund which will be administered by the International Bank for Reconstruction and Development (World Bank).

The work will consist of producing, processing, and stockpiling approximately 2.5 million tons of sand and aggregates for concrete and masonry and approximately 6.5 million tons of stone for riprap. The work will be covered by two schedules, one for the production of sand and aggregates and the other for production of stone, and tenders may be submitted for either or both schedules. The production and stockpiling of the materials will take place at two or more quarry sites or deposits which will be designated and made available to the contractor(s) by the Authority. Except for such sites and raw material, the contractor(s) will be required to supply all plant, supplies, other materials and labor to produce the specified sizes and grades of sand, aggregates and riprap.

Invitations to submit tenders and specifications for the work will be issued only to contractors who have been prequalified by the Authority. For this purpose those firms which are interested in the work are requested to submit information in support of their qualifications to undertake the work. Such information should include, but is not limited to, the complete name and address of the firm or company, its country of domicile, its legal organization or constitution, proof of its financial capacity, references, and evidence of its technical capability and experience in carrying out similar work. The specified information and documents should be prepared in two copies and delivered on or before 15 February 1961 to the Authority's Consultants, Tipton and Kalmbach, Inc.; the original addressed to P. O. Box 589, Lahore, West Pakistan and the copy to 831 Fourteenth Street, Denver 2, Colorado, U.S.A.

Contractors considered qualified to undertake the above work will subsequently be sent the specifications and be invited to submit a tender.

Project Director (Links)
WEST PAKISTAN WATER & POWER DEVELOPMENT AUTHORITY

Bids: February 21, 1961

New Jersey Turnpike Authority

ADVERTISEMENT FOR PROPOSALS
CONTRACT NOS. R-89A, R-89B, R-89C, R-89D AND R-89E

Proposals are invited for Contract Nos. R-89A, R-89B, R-89C, R-89D and R-89E which involves the construction of an addition and alterations to the present Service Building of the New Jersey Turnpike Authority, at Service Area 12S in the City of Secaucus, Hudson County, New Jersey as follows:

Contract No. R-89A—General Construction
Contract No. R-89B—Structural Steel
Contract No. R-89C—Heating, Ventilating and Air Conditioning
Contract No. R-89D—Plumbing
Contract No. R-89E—Electrical

Proposals will be received at the New Jersey Turnpike Authority Administration Building, New Brunswick, New Jersey, until 11:00 o'clock, Eastern Standard Time, on the morning of February 21, 1961, at which time and place said proposals will be publicly opened and read.

Each bidder must submit with his proposal a Contractor's Financial and Equipment Statement on the form furnished by the Authority.

Contract documents may be examined during office hours on or after January 31, 1961, at the office of the Authority, and will be furnished upon payment of Ten Dollars ($10.00) for each set, not refundable.

NEW JERSEY TURNPIKE AUTHORITY
Joseph Morecraft, Jr., Chairman

January 25, 1961

District of Columbia—Building Construction—Dept. of Sanitary Eng., D. C., Jan. 17, 1961. POTOMAC RIVER INTERCEPTOR SYSTEM PART 3—POTOMAC SEWAGE PUMPING STATION (Invitation No. C-6158-S), consisting of furnishing all labor, materials and equipment necessary and performing all work required for the construction of the Pumping Station, furnishing and installing equipment and all other appurtenant work. (Wage Rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Rm. 404, 499 Pa. Ave., N.W., upon deposit of a certified check for $50.00 per set, payable to D.C. Treasurer, (Phone NA 8-6000, Ext. 2378). SEALED BIDS to be opened 3:00 PM, EST, Feb. 14, 1961, in Room 424, 499 Pa. Ave., N.W.

Bids: March, 1961

Kingdom of Thailand
Royal Irrigation Department
Bangkok, Thailand

INVITATION FOR BIDS—NO. YS-1-7

The Royal Irrigation Department of the Kingdom of Thailand hereby invites sealed written bids for furnishing and delivering the following equipment either fob Contractor's shipping point or cif Bangkok Wharf, Thailand, for the Bhumiphol Power Plant, Yanhee Multipurpose Project, Kingdom of Thailand, in accordance with the Contract Documents, for:

One (1) forty-five (45) metric ton truck crane.

Invitations for Bids will be issued in January, 1961, and will be opened in March, 1961. Copies of Contract Documents, Invitation for Bids—No. YS-1-7, Forty-Five Metric Ton Truck Crane, may be obtained by qualified Bidders on written request to:

Royal Irrigation Department
Attention: Thai Liaison Engineer
c/o Engineering Consultants, Inc.
1901 South Navajo Street
Denver 23, Colorado, U. S. A.

Each request must be accompanied by a check or money order, payable to the Royal Irrigation Department, in the amount of U. S. $10.00 for each copy of the Contract Documents requested. The remittance is nonreturnable.

M. L. Xujati Kambhu
Director General
Royal Irrigation Department
Kingdom of Thailand
Bangkok, Thailand

(Additional Proposals on Page 128)

EMPLOYMENT OPPORTUNITIES

Send NEW Ads and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication. Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 11: 255 California St.

• POSITIONS VACANT

General Superintendent—Must be completely experienced in all phases of grading, paving, site work and road construction. Salary open, yearly employment, two weeks vacation. All replies confidential. Send complete resume to The Thomas Colla Company, 251 Broad St., Manchester, Conn.

Guard Rail Superintendent—Must be qualified to handle field reports, payroll forms and exercise independent judgment pertaining to problems of guard rail installation. Salary open. P-5955, Engineering News-Record.

Supt. and Foreman—Storm drain and flood control—Experienced large diam. pipe, excavation and conc. box. Proven organizer and producer—So. Calif. P-5957, Engineering News-Record.

Civil Engineer—Estimator—Must be completely experienced in site work take-offs. Salary open, yearly employment, two weeks vacation. All replies confidential. Send complete resume to The Thomas Colla Company, 251 Broad St., Manchester, Conn.

Equipment Superintendent for established highway and heavy construction contractor. Must have thorough knowledge and be capable to supervise the maintenance and repair of large heavy equipment spread. Excellent opportunity for right man. The W. L. Harper Company, P.O. Box #170, Cincinnati (12), Ohio.

Engineer—Estimator—Experienced in plant, mill and highway bridge construction. Location — Jacksonville, Florida. Send complete resume with anticipated salary to: P-5806, Engineering News-Record.

Electrical Engineer familiar with electric power systems. Permanent employment with opportunity for advancement in long-established consulting engineering firm. Write or call Stanley Engineering Company, Muscatine, Iowa.

(Continued on opposite page)

EMPLOYMENT OPPORTUNITIES

NATIONAL COVERAGE

DISPLAYED RATE:

The advertising rate is $45.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

An advertising inch is measured 7/8" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

FEBRUARY 16TH ISSUE CLOSES FEBRUARY 6TH

UNDISPLAYED RATE:

$2.70 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW Ads and Inquiries to Classified Advertising Division of ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

POSITIONS VACANT
(Continued from opposite page)

Estimator—General Superintendent—Experienced sewerage and waterworks construction. Engineering background desirable. Medium size contractor specializing all phases this type construction. Midwest location. Send complete resume. P-5970, Engineering News-Record.

Superintendent for roads, streets, bridges, levees, sewers, etc. in the Midwest within 100 miles of St. Louis. Give resume of Experience, references, age, marital status and salary expected. Engineering degree desirable but not essential. The right man could go far in this organization. P-6014, Engineering News-Record.

General Superintendent. Midwestern utility contractor, city distribution, cross country pipelines of all types, industrial piping and fabrication. Must have good following of top construction men, customer contacts and customer relations. Some estimating experience required and engineering experience would be an asset. Send complete resume. P-5875, Engineering News-Record.

Construction Supervision. Construction engineer for inspection and supervisory work on electric power lines and substations. Opportunity for permanent employment and advancement with well-known consulting engineering firm. Send resume to P-6005, Engineering News-Record.

Engineer-Director of Specifications Department. Large Midwest consulting firm has immediate opening for capable man with broad experience in specification writing for all branches of building construction work. Must also possess administrative ability. Moving expenses paid. Send complete resume of educational background and experience, including personal qualifications to P-6053, Engineering News-Record.

Wanted Superintendent or Assistant Superintendent for hydraulic dredging firm in midwest. Experience on State and Corps of Engineer contracts preferred. Excellent opportunity for right man. State experience and references. All replies confidential. P-6067, Engineering News-Record.

Village Engineer—The Village of Monona is accepting applications for the position of Village Engineer. Education and experience requirements are: graduate civil engineer, with general municipal experience, should be State of Wisconsin registered or eligible therefor within one year. Salary open. Write for application to E. J. Lottes, Village Administrator, 5211 Schluter Road, Madison 4, Wisconsin. Population of Village of Monona —8200.

Civil Engineering Graduate for permanent position in contractor's engineering department starting as field engineer on highway and bridge projects in New York-New England area. Send complete resume with anticipated salary to: P-6054, Engineering News-Record.

Survey Party Chief experienced in highway and bridge layout for New York-New England area. Send complete resume with anticipated salary to: P-6055, Engineering News-Record.

Structural Engineer-Experienced in design of bridges and buildings in steel and concrete. Submit resume and salary requirements. Permanent position with well established consulting firm. Location, Pennsylvania. P-6044, Engineering News-Record.

Engineer. Experienced in design to take charge of sanitary engineering, designing and drafting office. Salary open. Location Park Avenue, NYC. P-6039, Engineering News-Record.

POSITIONS VACANT

Assistant Director of Public Works. Newly created position. Salary $550-$600. College Graduate in Civil Engineering, 2 years experience municipal engineering. Must qualify for State of Washington registered Professional Engineer license. Closing date March 15, 1961. Apply City Manager's Office, City Hall, Walla Walla, Washington.

Wanted a full time City Engineer for the City of Cocoa, Florida. Must be registered in the State of Florida and have background and experience in engineering work pertaining to Municipalities. Contact Roy J. Amos, City Manager, City of Cocoa, Florida.

Administrative Engineer, familiar with highway design and materials, to coordinate activities of field engineering staff. Location: Midwest capital city. Position involves some travel in 5-state area. P-6057, Engineering News-Record.

• EMPLOYMENT SERVICES

200-1,000 new positions reported monthly. Get free copy. National Employment Reports. 20 E. Jackson, 902-B, Chicago 4.

• POSITIONS WANTED

Chief Estimator or Construction Manager age, 34, C.E.—49. Industrial, commercial and institutional, excellent record, desires position with opportunity. PW-5989, Engineering News-Record.

Project Manager — Construction Superintendent—wide experience estimating to completion, highways, airports and heavy construction projects. 15 years last contractor. Resume on request. PW-5979, Engineering News-Record.

Civil engineer, 37, married, 16 years experience from Europe, Middle East, Canada, in heavy construction and design of highways, sewers, bridges etc., presently chief engineer in heavy construction, several languages, desire job U.S. or O.S. PW-5974, Engineering News-Record.

Civil Engineer P.E. Age 35 extensive design and construction experience in reinforced, precast and prestressed concrete. PW-5977, Engineering News-Record.

Senior Civil Structural Engineer, Regist. P.E. in 8 States, broad experiences on structures of magnitude: steel, concrete, prestressed, posttensioned; has imagination for unusual structures; handles multi-million dollar jobs from A to Z. Available for partnership or responsible position. PW-6027, Engineering News-Record.

Const. Supt.—field engineer, 34. Eleven years heavy constr., structures to million dollar level. Nine years present affiliation. Experience covers most phases of power plant, bridge, and dam construction. Also waterfront work and diving. Desires challenging position with general contractor, foreign or domestic. Available three weeks notice. PW-6004, Engineering News-Record.

Project Manager. B.S.C.E. with experience managing small construction company doing both building and heavy construction work in the public work field. PW-6029, Engineering News-Record.

B.S.C.E. + 2 yrs. Grad. Business School, 32, Married. 4 years experience in soils, asphalt, & concrete — covering design, laboratory, inspection, and supervision. Wish to broaden experience and therefore am seeking a Sales Eng. or Industrial Eng. position. Available immediately. Will locate anywhere. P.O. Box 139, Hershey, Penna.

GERMAN FIRM
well qualified to represent American manufacturers of construction equipment for
Highway Construction
Railway Construction
Concrete Handling
Reply to: ROBERT H. POEHLER
Esplanade 6 Hamberg 36, West Germany

POSITIONS WANTED

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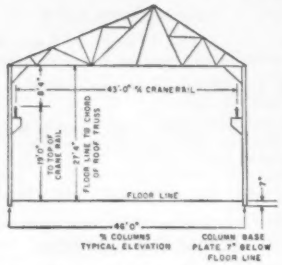
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Excavation, Common	2,000,000 m3
Excavation, Rock	230,000 m3
Fill	1,100,000 m3
Schedule 2—Intake, Penstock and Powerhouse	
Excavation, Unclassified	130,000 m3
Concrete	4,000 m3
Steel Penstock	1,300,000 kg

The Contract Documents require prequalification of bidders and the following information must be submitted for prequalification:

1. List of similar completed work with dates, total amount of contract and reference from clients.
2. List of equipment available for the work and ownership of same.
3. Statement of financial resources.
4. Banking references.
5. Qualifications and experience records of the personnel.
6. Other information by which fitness to submit a proposal can be judged.

All prequalification information must be sent to both the Empresa Nacional de Energia Electrica, Apartado Postal No. 99, Tegucigalpa, D.C., Honduras, Central America, and Harza Engineering Company, 400 West Madison Street, Chicago 6, Illinois, USA.

Contract Documents will automatically be issued to qualified bidders.

Bids must be submitted in triplicate in accordance with the instructions to Bidders. A bid bond or certified check as guarantee will be required with each bid.

The right is reserved to make award on any bid or to reject any or all bids.

Payment for foreign expenditures for the construction of the project will be made from proceeds of a loan, guaranteed by the Republic of Honduras from the International Bank for Reconstruction and Development to the Empresa Nacional de Energia Electrica. Payment for local expenditures will be made from funds of the Empresa Nacional de Energia Electrica and from the proceeds of a loan guaranteed by the Republic of Honduras from the Development Loan Fund to the Empresa Nacional de Energia Electrica.

OFFICIAL PROPOSALS

Bids: March 14, 1961

Philadelphia, Penna. Procurement Department Water Department

Sealed bids will be received in Room 313, City Hall Annex, until 2:30 P.M. (E.S.T.) on Tuesday, March 14, 1961, and opened at that time, for Bid No. 2717—Work No. SD-254-SW.

Construction of Intercepting Sewer in Right of Way of 69th Street Branch of Philadelphia-Baltimore and Washington Railroad from 67th Street to the Right of Way of Chester Branch of the Reading Company and in Right of Way of Chester Branch of the Reading Company from Right of Way of 60th Street Branch of Philadelphia-Baltimore and Washington Railroad to 56th Street Lower Schuylkill West Side Intercepting System.

PRINCIPAL ITEMS OF WORK

Excavation in Tunnel	6,972 lin. ft.
Excavation—Open Cut—Shafts—Manholes and Sewer	1,300 cu. yds.
3 feet 6 inches diameter Concrete Sewer in Tunnel	1,977 lin. ft.
3 feet diameter Concrete Sewer in Tunnel	4,995 lin. ft.
Vacuum Processing in Tunnel	19,220 sq. ft.
Manholes	13

Proposal forms, questionnaires and specifications may be obtained from the Water Department, in Room 1132, City Hall Annex, Juniper Street and Filbert Street, Philadelphia 7, Penna. Blueprints of plans may be purchased at bidder's expense, directly from the Keystone Blue Paper Company, 1230 Arch Street, Philadelphia 7, Penna.

No bids will be received unless bidder is qualified by the Procurement Commissioner. The questionnaire form with all questions fully answered must be filed with the Water Commissioner, Room 1113, City Hall Annex, at least one (1) week prior to the date of opining bids.

Each proposal must be accompanied by security in form and amount as set forth in the proposal form.

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ENR—T1/3

Poor Policy

FULL DISCLOSURE of the damage that was being repaired on Texas Tower No. 4 before its tragic collapse on January 15 would have made explanations now ever so much easier. Instead, the Air Force imposed a veil of secrecy over the nature and extent of the damage the tower suffered—in Hurricane Donna last September and even before. Even when repair contracts were awarded their details were withheld, and no one connected with the job was allowed to talk about it.

Now all concerned have another kind of repair job on their hands—to repair a loss of confidence in the abilities of the construction fraternity.

For the most part, engineers and contractors, when trouble occurs on one of their jobs, recognize the value of discussing it frankly. Too often, however, they are overruled by some higher authority, or think they will be. And in these cases they seldom push their viewpoint very vigorously—and this goes for consulting engineer and contractor relationships with clients as much as it does for engineers in government agencies. The frequent result is that by the time the facts come out—and they invariably do—unjustified rumors have developed, which are difficult to dissipate.

In the case of the Texas Tower there was nothing particularly to be ashamed of back in September when the tower was damaged by high winds and mountainous waves. It was, after all, a pioneer structure undertaken with a calculated risk. No framed structure had ever before been placed in water as deep as 185 ft, even in an unexposed location. At its site, 80 miles out in the Atlantic Ocean, wave and wind forces could be expected to be great, but just how great had to be estimated. The manner in which the structure should be pre-framed—the size of braces, the types of connections and the spread of the base—in order to be towed out, upended and sunk was a matter of engineering judgment with little in the way of close precedent to guide it.

In spite of all these problems and difficulties, the tower was successfully placed—and then successfully operated for some months. What happened then was kept a secret. Had a frank statement been made in September of the damage and the difficulties of repair—even perhaps of doubts that the repairs would be successful—it would have been greeted with sympathetic understanding. What is also possible, even though perhaps remote, is that had the damage been common knowledge someone might have come up with an idea for repairs that would have worked.

Now the explanation must be made under much more difficult conditions. In revealing the nature and extent of the damage, as reported on p. 22, the Air Force has taken a wise step to reverse its secrecy policy. This policy was a poor one in this case as it will be in every other case of trouble on a construction job. Franker discussions of the difficulties of construction will always foster greater understanding, and in the end lead to greater appreciation of construction's achievements. Nor is it to be overlooked that these achievements will be more certain and secure—even more numerous—when the profession exacts the maximum of new knowledge from every difficulty and failure. Secrecy will surely stymie any such degree of success.

The Technological Elite

IN HIS FAREWELL ADDRESS to the nation, President Eisenhower warned against pressure groups gaining too much influence over public policy. And he singled out as special dangers the growth of a "military-industrial complex" and a "scientific-technological elite."

Thinking back to the dominance of military-industrial complexes in pre-war Japan and Nazi Germany and noting the influence of a technological elite in Communist Russia, the warning takes on specific meaning. Nevertheless, it will seem strange to U.S. engineers, who have been striving to be more influential—and even just a little elite—to have to regard themselves as a menace, even in some distant future. In the meantime, however, the best possible course is to go on striving, keeping in mind the danger to our democratic way of life of any too powerful pressure group. It was no doubt in that vein that the farewell warning was given.

The Guinea Pigs

THOSE WHO ARE WORRIED by the inadequacy of transportation in our large cities will be cheered to know that the U.S. Senate has been hard at work on a solution. Puttering around in the basement, so to speak, the lawmakers have just about finished work on a subway system that will carry them the 1,800 ft between the Capitol and the New Senate Office Building.

With typical modesty, the Senators wish to try their rapid transit solution on themselves first, to offer themselves as guinea pigs for the furtherance of transportation science.

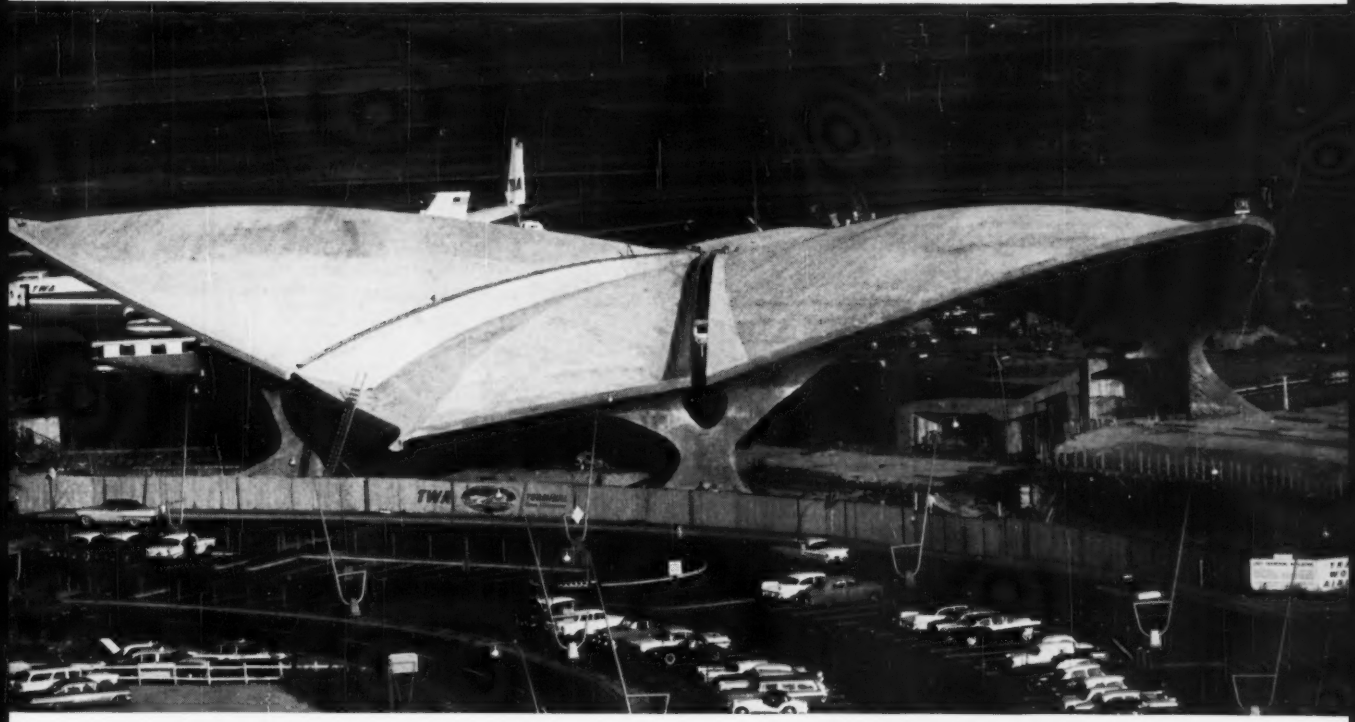
The new, $2.5-million subway will carry the 100 Senators back and forth in four new cars furnished with leather-cushioned seats. Spacious platforms will permit dignified arrivals and departures. There will be tastefully designed rest rooms and a telephone lounge. On reaching the new $2.8-million terminal under the Capitol the Senators can choose among an elevator, an escalator and (a touch of early Americana) stairs as a means of ascending the seven feet to the Capitol basement.

This outstanding bit of trail-blazing should not go unrecognized. The Senators have a real winner in their prototype subway. There can be no doubt but that subways like this will be enthusiastically accepted in every large city in the country.

"We couldn't have placed this kind of concrete without POZZOLITH"

Report on precise set control at new TWA terminal

KENNETH P. MORRIS, Field Project Manager
Grove, Shepherd, Wilson & Kruge, Inc., New York City.



"This TWA project is the biggest challenge to concrete men I've seen in 30 years. The massive concrete roof shell is an arch cantilever design—thickness ranging from 8" at the edges to 44" at the centerplate. Each of the four lightweight concrete shells had to be a continuous monolithic section and the complex roof geometry required counterforms to hold concrete on the steep slopes during initial set.

"The critical part was *timing* the removal of counterforms to allow finishing to the final architectural contours. The key to that problem was precise set control of the concrete.

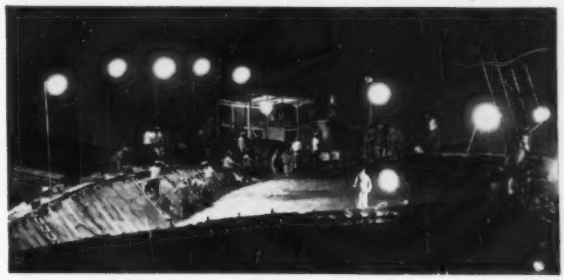
"The design mix for the Norlite lightweight aggregate called for 7¾ sacks of cement with 7" slump for an ultimate strength of 4000 psi. Our final mix for the job was designed with 6½ sacks and POZZOLITH. We used 5" slump under the counterforms and 3" slump outside. POZZOLITH gave us remarkable set control . . . the *precise set* we wanted, anywhere in the range of one-to-four hours. The concrete finished easily with good texture, no plastic cracking and low shrinkage. And it tested at over 5000 psi.

"Credit goes to the effective set control system worked out with Master Builders. At our two batching stations, POZZOLITH was added to produce the precise set needed for each individual load of concrete. Stations got their instructions by walkie-talkie from the concreting superintendent on the roof.

"The teamwork between our men, the supervising architect, engineers, test lab, ready-mix men and the Master Builders field men was the finest we've ever seen . . . and that 6000 tons of sculptured concrete you see standing there is the best proof I know."

For lowest cost-in-place, superior quality concrete–there's no equal to POZZOLITH. Call in the local Master Builders field man to demonstrate how POZZOLITH can help put you ahead on your current job.

NEW TRANS WORLD AIRLINES UNIT TERMINAL, Idlewild Airport, New York. Two-and-a-half year project scheduled for completion in late 1961. Four roof shells weigh 6000 tons, contain 3200 cu. yd. POZZOLITH concrete and 500 tons steel over a 50,000 sq. ft. area.



ROUND-THE-CLOCK CONCRETING of roof shells took from 24 to 30 hours per shell. Three 180-foot cranes hoisted half-yard concrete buckets to pre-planned locations. TWA Project • Architect: Eero Saarinen & Associates • Supervising Resident Architect: Ralph Yeakel • Consulting Engineers: Ammann & Whitney—Boyd G. Anderson, Senior Partner in Charge • General Contractor: Grove, Shepherd, Wilson & Kruge, Inc. • Testing: Haller Testing Laboratories, Inc. • Ready-Mix Concrete: Transit Mix Concrete Corp.

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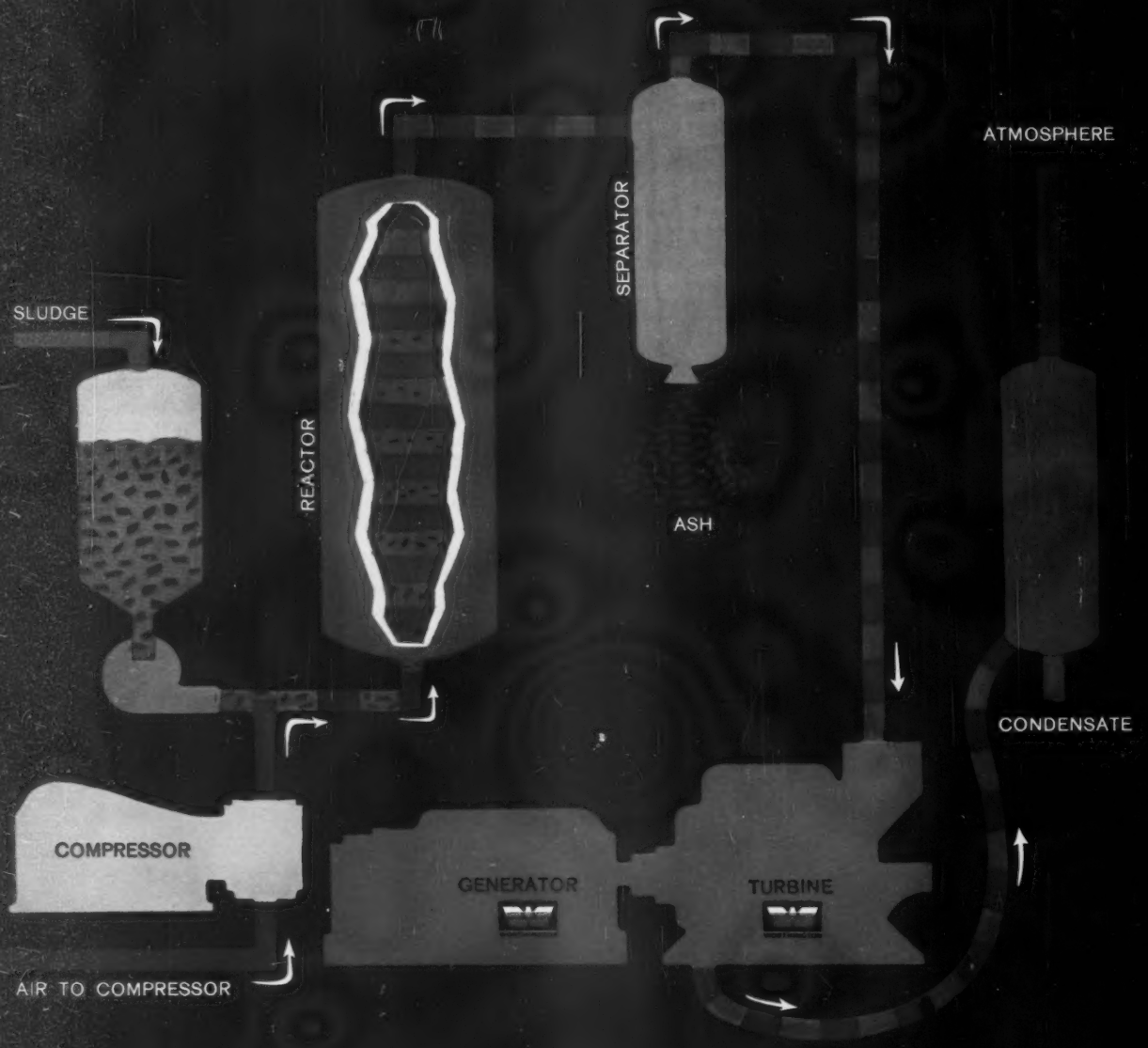

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For further information about any power recovery turbine application, write or call Worthington Corporation, Turbine Division, Dept. 48-13, Wellsville, New York.

*The Zimmermann Process is patented and licensed by Sterling Drug Inc., N. Y. C., N. Y.

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